

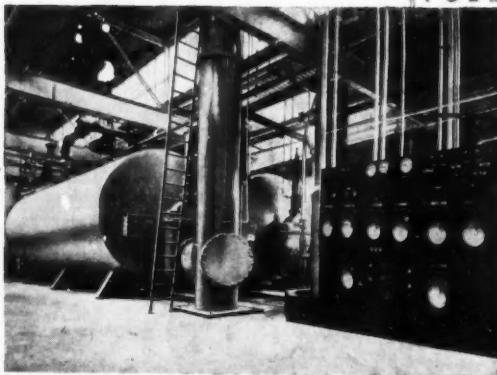
# The Chemical Age

VOL LXII

20 MAY 1950

No 1610

Solvent **ACTICARBONE** Recovery



PLANT : Solvent Recovery, Drying of Gases, Distillation, Electrostatic Precipitators.

PRODUCTS : Activated Carbons, Filter Aids, Activated Earths, Bentonite, Kieselguhr.

# CECA

THE BRITISH CECA COMPANY LTD.

175, PICCADILLY, LONDON, W.I. Telephone : Regent 0856 (3 lines)  
CABLES : ACTICARBON, LONDON

**CRUICKSHANKS**

for

**ACIDS and CHEMICALS**

Hydrofluoric Acids and Fluorides  
Hydrofluosilicic Acid and Silicofluorides  
Fluoboric Acid and Fluoborates  
Copper, Nickel and Zinc Compounds

**CYANIDES of**

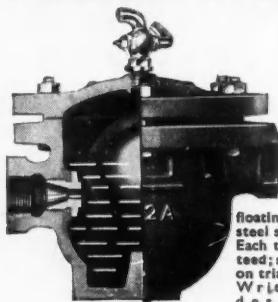
Cadmium, Copper, Gold, Nickel,  
Potassium, Silver, Sodium and Zinc

**PREPARED PLATING SALTS for**  
Brass, Cadmium, Chrome, Copper,  
Nickel, Silver, Tin, Zinc, etc.

**R. CRUICKSHANK, LTD.**

Camden Street - - Birmingham, I  
Telephone : B'ham Central 8553 (6 lines)  
Telegrams and Cables : Cruickshank, Birmingham

# "Simplicity" STEAM TRAPS



cannot jam  
or blow steam.

Unique in  
design, fool-  
proof in opera-  
tion.

"Simplicity"  
Steam Traps  
have only  
one moving  
part—a free  
floating stainless  
steel sphere.

Each trap is guaran-  
teed; send for a trap  
on trial.

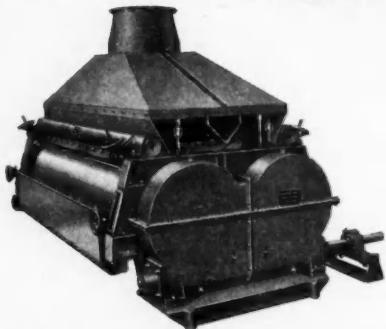
Write for fully  
descriptive  
pamphlet.

Agents and Stockists in many countries, the names of  
whom we will gladly send on application.

**THE KEY ENGINEERING CO., LTD.**

4 QUEEN VICTORIA STREET, LONDON, E.C.4  
and TRAFFORD PARK, MANCHESTER.  
Telephone : CITY 1195/6. TRAFFORD PARK 1903.

## MULTITUBULAR DRIERS ROLLER FILM DRIERS FLAKERS AND COOLERS



We offer accumulated experience  
of 50 years' specialization.

OUR WORKS, the largest in the  
United Kingdom devoted especially  
to DRYING MACHINERY, are  
laid out and equipped with  
the latest plant for this particular  
purpose.

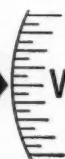
MANY STANDARD SIZES including LABORATORY MODELS.

We have test plants always available

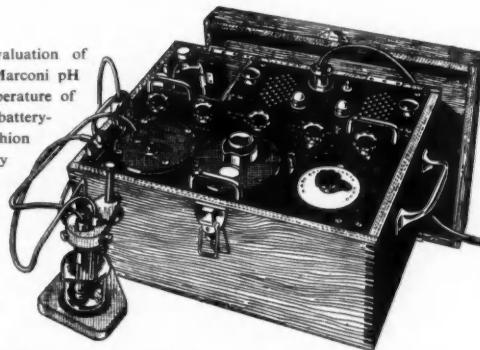
**RICHARD SIMON & SONS, LTD.**

PHENIX WORKS, BASFORD, NOTTINGHAM

# THE TRUE VALUATION OF pH



Because modern practice demands the true valuation of pH, no laboratory is complete without its Marconi pH Meter which, irrespective of the colour or temperature of a solution, is accurate to  $\pm 0.02$  pH. Mains or battery-operated models are available for use in simple fashion by even semi-skilled personnel. A particularly robust glass electrode withstands more than ordinary usage, the instrument itself being built to give years of dependable service. Hundreds of Marconi pH Meters are already installed in the world's laboratories—why not ask for a demonstration? Early delivery can be arranged.



## Marconi Instruments Ltd.

ST. ALBANS, HERTS

Telephone : St. Albans 6161/5.

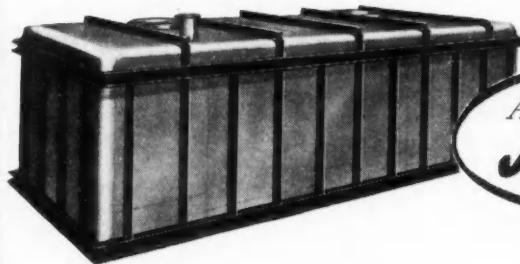


Northern Office: 30 Albion Street, Hull.

Midland Office: 19 The Parade, Leamington Spa.

Western Office: 76 Portview Road, Avonmouth.

Southern Office and Showroom: 109 Eaton Square, London, S.W.1



*Always specify  
Jenkins*



## Welded STAINLESS STEEL TANKS, MIXERS and PANS

Special facilities in a special shop are concentrated on producing many kinds of stainless steel equipment for industrial purposes

EXPORT ENQUIRIES INVITED

**Robert Jenkins & Co Ltd.**  
ESTABLISHED 1850  
ROOTHERHAM



THE SIGN OF  
GOOD WELDING

Hopwood

Telephone: 4201-6 (6 lines)

A

# Safety First

First Aid Outfits, etc., complying with Factory Regulations. Factory Thermometers, etc.

**FIRST AID SUPPLY CO. 1925**

88, NEWINGTON BUTTS, LONDON, S.E.11

Telephone : RELiance 1823

## BELTING AND ENDLESS VEE ROPES

Superlative Quality  
Large Stocks - Prompt Despatch

**FRANCIS W. HARRIS & Co. Ltd.**

BURSLEM - Stoke-on-Trent

Phone : Stoke-on-Trent 87181-2

Grams : Belting, Burslem

All the answers  
are in this  
**"EVERTRUSTY"**  
GOOGLE & RESPIRATOR  
BOOKLET



This "EVERTRUSTY" Goggle and Respirator Booklet illustrates and describes our wide range of "EVERTRUSTY" goggles, spectacles, respirators, hoods and face shields in all materials for every industrial purpose. It forms a complete guide to eye, face and lung protection in industry.

The coupon below will bring you this booklet free, together with its companion booklets dealing with industrial gloves and protective clothing.

**WALLACH BROS.  
Ltd**

### THIS COUPON

pinned to your letterhead and posted to  
WALLACH BROS. LTD., 49, Tabernacle  
Street, London, E.C.2, will bring you illus-  
trated Booklets No. 2 showing the full range  
of "EVERTRUSTY" protective devices.

## SAFETY FIRST

THE "OLDBURY" PATENT  
CARBOY DISCHARGER  
will empty and elevate up to 50 feet  
the contents of any carboy, bottle or  
vessel, and complies with all the con-  
ditions of the Factory Act of 1937.

**KESTNER'S**

5, Grosvenor Gardens, Westminster, London, S.W.

## WILSON BROTHERS

(General Sheet Metal Workers)

MACHINERY GUARDS TO SPECIFICATION  
OXY-ACET. AND ELEC. ARC WELDING

677(a) ATTERCLIFFE COMMON, SHEFFIELD, 9.

## HYDROGEN PEROXIDE

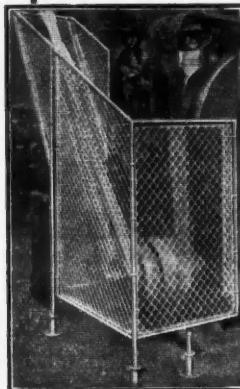
Concentrated Qualities Dyestuffs & Chemicals

**COLE & WILSON, LTD.**

24, Greenhead Road, HUDDERSFIELD

Phone: Huddersfield 1993. Grams: 'Colour' Huddersfield

## POTTER'S Machinery Guards



● DESIGNED  
FOR SAFETY

● BUILT  
FOR SERVICE

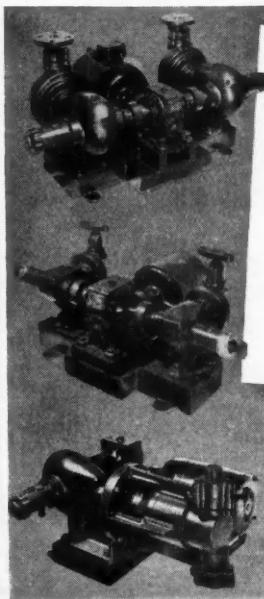
Potter's guards are installed in works throughout the country and are distinguishable by their sound construction, good fitting and many exclusive features.

**F.W.POTTER & SOAR LTD.**

PHIPP STREET, LONDON, E.C.2  
Telephones : 88Shoreditch 2177 (3 lines)

## INDEX TO ADVERTISERS IN THIS ISSUE

	Page		Page
Associated Lead Manufacturers, Ltd.	xvii	Key Engineering Co., Ltd. (The)	Cover ii
Bamag, Ltd.	767	Leigh & Sons Metal Works	xxii
Blackwell's Metallurgical Works, Ltd.	xxii	Lennox Foundry Co., Ltd.	xxii
British Acheson Electrodes, Ltd.	Cover iv	Marconi Instruments, Ltd.	i
British Caca Co., Ltd. (The)	Front Cover	Metalfiltration Co., Ltd. (The)	xvi
Brough, E. A., & Co., Ltd.	iv	Metropolitan-Vickers Electrical Co., Ltd.	Cover iv
Chemical Engineering & Wilton's Patent		Mirlees Watson Co., Ltd. (The)	769
Furnace Co., Ltd. (The)	xii	Mitchell, L. A., Ltd.	xxii
Classified Advertisements	770, xix, xx & xxi	National Coal Board	xii
Cole & Wilson, Ltd.	ii	New Metals & Chemicals, Ltd.	xiv
Cruickshank, R., Ltd.	Cover ii	Organic Dyestuffs, Ltd.	xv
E.C.D., Ltd.	iii	Orr, George W., & Co., Ltd.	Cover iii
Farwig, J. F., & Co., Ltd.	x	Paget, R. F.	xxi
First Aid Supply Co., 1925	ii	Perry & Hope, Ltd.	xxi
Gas Council (The)	xi	Potter, F. W., & Soar, Ltd.	ii
General Metallurgical & Chemical, Ltd.	viii	Power-Gas Corporation (The)	ix
Girling, S., & Sons (Coopers) Ltd.	xxii	Robinson Brothers, Ltd.	xxii
Harris, Francis W., & Co., Ltd.	ii	Sandiacre Screw Co., Ltd.	vi
Haughton's Metallic Co., Ltd.	xxi	Shawinigan, Ltd.	xiv
Hess Products, Ltd.	xiii	Shell Chemicals, Ltd.	xviii
Hill-Jones, Thos., Ltd.	Cover iii	Simon, Richard, & Sons, Ltd.	Cover ii
Holland, B. A. Engineering Co., Ltd. (The)	viii	Spence, Peter, & Sons, Ltd.	iv
Imperial Chemical Industries, Ltd.	v	Wallace Brothers, Ltd.	ii
International Pulverisers, Ltd.	Cover iii	Ward, Thos. W., Ltd.	vii
Ispat, Ltd.	vi	Wilkinson, James, & Son, Ltd.	xvi
Jenkins, Robert, & Co., Ltd.	i	Wilson Brothers	ii
Kestner Evaporator & Engineering Co., Ltd.	ii, x & xxi		



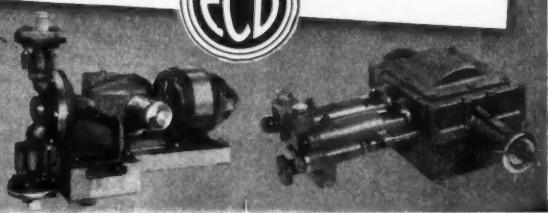
## Proportioning & Metering Pumps

E.C.D. Pumps are manufactured in diaphragm and plunger types for handling measured quantities of all classes of chemical and industrial process fluids—volatile, corrosive, or precious. Automatic or hand micro adjustment is fitted where required. Full particulars of pumps for any purpose and descriptive booklet will be gladly sent on request.

**E.C.D. LIMITED - ENGINEERS**

Tonbridge, Kent

Tel: Tonbridge 2237





BROUGH'S NEW TYPE K.C.C. DRUM WITH SLOPING TOP. Top free from dirt-collecting edges. Stacks efficiently. Drains perfectly. Costs little more than ordinary drums (Patent and design registered).

BROUGH'S SPECIAL TRACTOR TAPER. Neck welded or seamed on to an extended collar able to reach difficult tractor apertures. A strong, light package. No "vertical" joints.

BROUGH'S HALF TAPER. Has most of the advantages of a taper with easier stacking.

THERE'S A BROUGH'S DRUM FOR EVERY PURPOSE



# Brough's DRUMS

LIVERPOOL : : : SPEKE  
Telephone, Liverpool Royal 3031 : : : Telegrams, "Superdrum"



## Effluent problems

PETER SPENCE & SONS LTD RECOMMEND THE USE OF

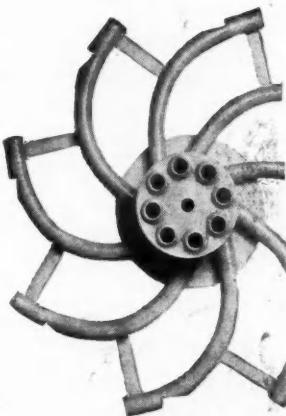
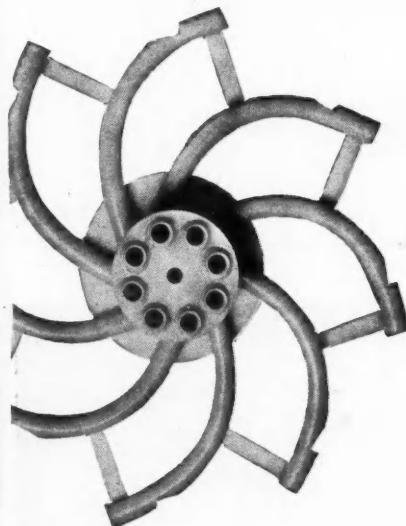
## Aluminium Sulphate

WHICH REDUCES THE TROUBLESOME FINELY DIVIDED SUSPENDED SOLIDS AND THE "OXYGEN ABSORBED" FIGURES. Typical examples are:

A Bleach Works	Effluent before treatment O.A. : 150 parts per 10 <sup>5</sup>
	Effluent AFTER treatment O.A. : 48 parts per 10 <sup>5</sup>
A Tannery	Effluent before treatment O.A. : 74.8 parts per 10 <sup>5</sup>
	Suspended solids : 788.2 parts per 10 <sup>5</sup>
	Effluent AFTER treatment O.A. : 16.2 parts per 10 <sup>5</sup>
	Suspended solids : 2.4 parts per 10 <sup>5</sup>
A Food Factory	Effluent before treatment O.A. : 67 parts per 10 <sup>5</sup>
	Effluent AFTER treatment O.A. : 20 parts per 10 <sup>5</sup>

PETER SPENCE & SONS LTD

## 'ALKATHENE'\*



for  
chemical  
plant

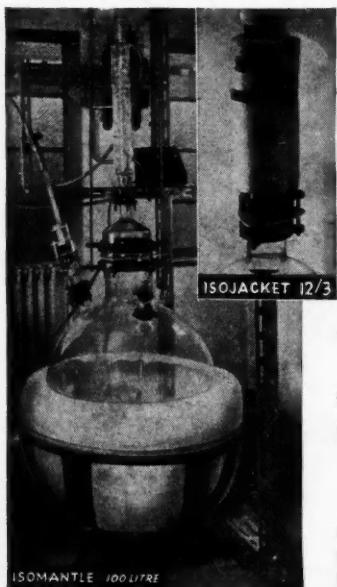
Outstanding chemical resistance at temperatures up to 65°C., combined with ease of fabrication, make 'Alkathene' particularly suitable for large and complicated pieces of chemical plant. This metering wheel, 3 feet in diameter, made by Rediweld Ltd., is used for hydrofluoric acid.

\* 'Alkathene' is the registered trade mark of polythene manufactured by I.C.I.

IMPERIAL CHEMICAL INDUSTRIES LIMITED  
LONDON, S.W.1



P.396



**ISOMANTLES**  
for  
**Safe, controlled  
electric heating**  
up to 360°C  
of LABORATORY and  
PRODUCTION PLANT

for Flasks from 100 ml. to 200 litres capacity,  
Columns, Funnels and Beakers as well as  
METAL PLANT

Many thousands in daily use.

Leaflets and technical data from the makers :  
**ISOPAD LTD. (Dept. C.A.3), 13/17 Rosemont Road,  
London, N.W.3.** 'Phone : HAMPstead 1769. 8466/7

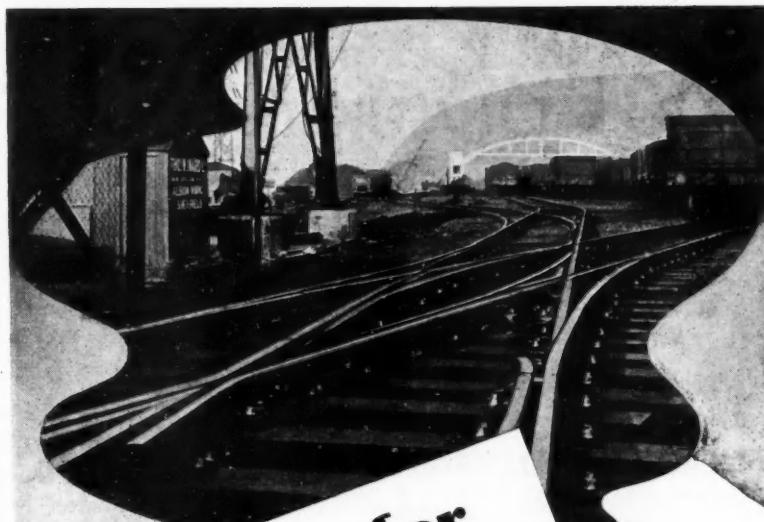
**SANDIACRE**

**SCREW CO LTD**

**STAINLESS  
STEELS**

Bolts, nuts, studs and machined  
parts from bar materials, in all  
classes of Heat-resisting and

SANDIACRE, Nr. NOTTINGHAM · Tel. SANDIACRE 2209 · Grams: SCREWS SANDIACRE



## WARDS for RAILWAY SIDINGS

Because Ward's planned siding construction combines sound railway technique with wide experience of operating conditions, there is a technical excellence about a Ward-built siding which makes for low operating costs and minimum maintenance charges.

This is a point of primary importance to the present day owner-operator of private railway sidings.



*The Railway Siding Consultants  
and Contractors*

**THOS. W. WARD LTD**  
**ALBION WORKS - SHEFFIELD**

TELEPHONE 26311 (15 LINES) - TELEGRAMS FORWARD SHEFFIELD  
LONDON OFFICE: BRETTENHAM HOUSE - LANCASTER PLACE - STRAND - W.C.2

TRI . . . . TRI . . . . TRI . . . . AGAIN

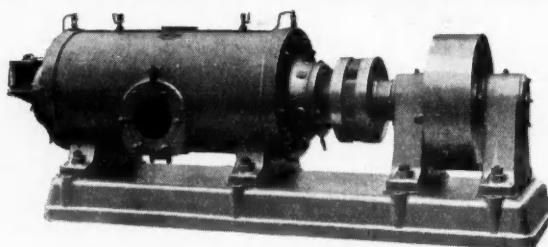
## ● TRIETHANOLAMINE

- This popular solvent, humectant, plasticiser and organic emulsifying base is again in good supply.
- TRY IT AGAIN for emulsions of oils, fats and waxes for every industrial purpose.
- Its uses are described in our booklet EMULSIONS.

### GENERAL METALLURGICAL AND CHEMICAL LTD.

120 Moorgate, London, E.C.2  
MONarch 4328

62 Market St., Manchester 1  
BLAckfriars 8750



### HOLLAND - S.L.M

*Rotary Compressors and Vacuum Pumps*

LOW MAINTENANCE COSTS : LONG LIFE  
INITIAL EFFICIENCIES MAINTAINED  
OVER YEARS OF SERVICE

### The B.A. Holland Engineering Co. Ltd.

Works : Slough, Bucks.

Technical Office: LINDO LODGE, STANLEY AVENUE, CHESHAM, BUCKS.

Telephone: Chesham 406

## CHEMICAL AND GAS ENGINEERING CONTRACTORS

SPECIALISTS IN DESIGN AND MANUFACTURE  
OF COMPLETE PROCESS PLANT & EQUIPMENT FOR

- PRODUCTION, COOLING AND PURIFICATION OF INDUSTRIAL GASES
  - WATER GAS, PRODUCER GAS, HYDROGEN
  - CATALYTIC PROCESSING OF GASES
- REFINING AND HYDROGENATION OF OILS AND FATS producing  
EDIBLE AND INDUSTRIAL OILS, HARDENED FATS, VEGETABLE  
GHEE, FATTY ACIDS, GLYCERINE
- CALCINATION OF LIMESTONE, DOLOMITE, AND MAGNESITE
  - CAUSTIC SODA BY ELECTROLYSIS
  - SULPHURIC ACID
- AMMONIA AND METHANOL SYNTHESIS
- AMMONIUM SULPHATE AND NITRATE
- DUST AND FUME CONTROL AND RECOVERY
- INDUSTRIAL CRYSTALLIZATION

Although specializing in the above plants we are fully  
equipped to undertake other new and original projects.

We are prepared to collaborate in design and specifications of plants planned  
by clients right through to manufacture, erection and putting to work.

Illustrated bulletins describing the various types of plants available on request.

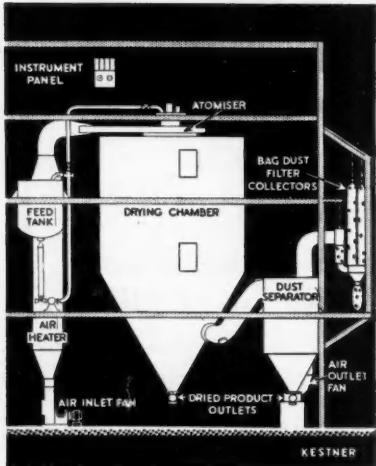
**THE POWER-GAS CORPORATION LTD**

STOCKTON - ON - TEES



AND LONDON, AUSTRALIA, CANADA, INDIA, SOUTH AFRICA

# Continuous production of powders from Liquids or Semi-Solids!



Kestner Drying Plants are designed to produce a uniform dry powder from a wide variety of liquids or semi-solids. Drying is instantaneous and discharge of the finished product continuous. Evaporation rates range from one pound to one ton of water per hour. With forty years experience in industrial drying, Kestners lead the world in spray drying technique, and have pioneered the pneumatic T.V. Drying System. Demonstrations of the superior features of Kestner drying Plant will be gladly given in London.

## Kestner

SPRAY DRIER & T. V. DRIER  
for free-flowing liquids

for semi-solids

Designed and manufactured by  
**KESTNER EVAPORATOR & ENGINEERING CO., LTD.**  
Chemical Engineers  
5 GROSVENOR GARDENS, LONDON, S.W.1.

## Tins for all Trades Home & Export



Square can showing  
patent screw neck.  
Patent No. 382,380



CAPSULING MACHINE



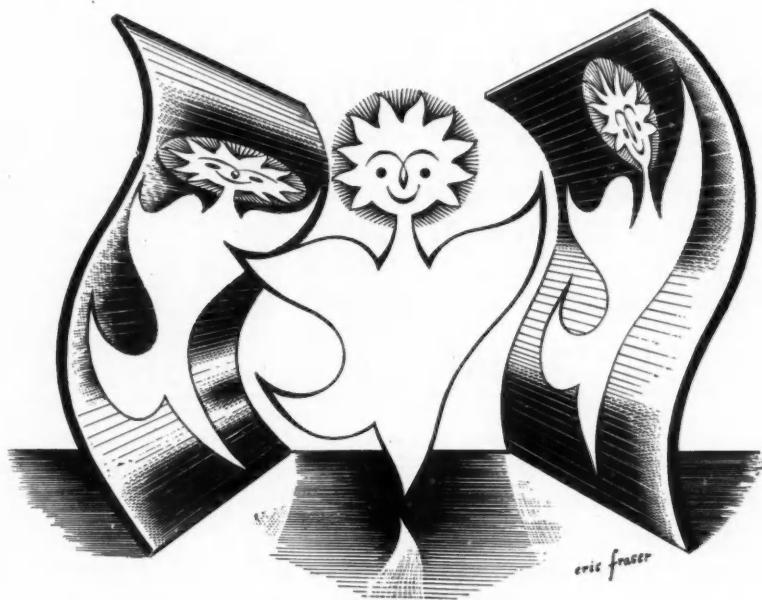
NECK, PLUGS and CAPSULES  
for hermetically sealing cans  
holding liquids.

**SPECIALISTS IN PRESS FITTINGS** for all types of Cans and Drums  
Contractors to the Admiralty, Ministry of Supply, India Office,  
Crown Agents for the Colonies, etc., etc.

**J. F. Farwig & Co**  
LIMITED

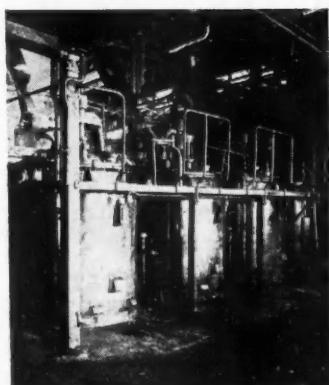
Est. 1809

208-214 YORK RD., BATTERSEA, LONDON, S.W.11  
Grams: CALORIGEN, BATT, LONDON.  
Tel: Battersea 7008



## 'FLEXIBLE' IS MY MIDDLE NAME! says Mr. Therm

The gas and gas-heated equipment that Mr. Therm brings in his train are amazingly flexible in their applications to all sorts of heating problems. What other fuel but gas could give you a tiny—but steady—pin-point of flame or full heat the instant you want it? And gas can be controlled at the flick of a finger—or can be completely automatic if required. It needs no storage space, is smokeless and ash-free, and works unfailingly for you with remarkable efficiency. No wonder Mr. Therm is to be found hard at work in so many industries!



See, for instance, how compact an installation can be devised. Here is part of a battery of reaction vessels—each of 220 gallon capacity—used in the production of aniline dye at the works of Williams (Hounslow) Ltd. Town gas is used throughout for heating. The specially-designed internally insulated housings hold cast-iron pans which are enamelled inside, and fitted with belt-driven agitating mechanism

**MR. THERM BURNS TO SERVE YOU!**

THE NATIONAL COAL BOARD ARE PRODUCERS OF

## WITHERITE

(MINERAL BARIUM CARBONATE)

IN ALL GRADES

LUMPS, NUTS, PEAS & FINES

90-94%  $\text{Ba CO}_3$

AIR-FLOATED WITHERITE

93-95%  $\text{Ba CO}_3$

(CONFORMING TO B.S.S. NO. 926-1940)

PULVERISED WITHERITE

EXTENDERS FOR PAINTS)

92-95%  $\text{Ba CO}_3$

(GLASSMAKERS AND OTHER GRADES)

ALSO

## BARIUM CHLORIDE

(COMMERCIAL CRYSTALS :

98-100%  $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$

INQUIRIES SHOULD BE ADDRESSED TO:—

AREA MARKETING MANAGER, NO. 6 AREA, NORTHERN DIVISION,

NATIONAL COAL BOARD,

"D" FLOOR, MILBURN HOUSE,

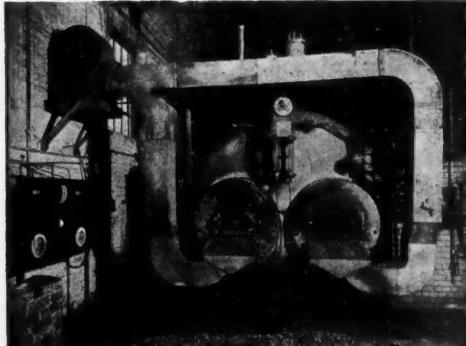
NEWCASTLE ON TYNE, I

TELEGRAMS "SIXAREA" NEWCASTLE ON TYNE

TELEPHONE NO. NEWCASTLE 26161 (PRIVATE EXCHANGE)

21471, 21472, 21473

## OVER 40 YEARS EXPERIENCE



IN THE MANUFACTURE  
OF  
FORCED DRAUGHT  
FURNACES FOR  
CHEMICAL WORKS  
STEAM BOILERS AND  
STILLS

Burning Fuels of any  
type and size

THE CHEMICAL ENGINEERING AND WILTON'S PATENT  
FURNACE COMPANY LIMITED. HORSHAM, SUSSEX.

Northern Office and Fuel Engineer

T. G. Fegan, Cannonfield,  
Hathersage, Nr. Sheffield.

Phone: Hathersage 333

Phone: Horsham 965

Grams: Evaporator



### HIGH-PURITY FATTY ACIDS

will soon be available in Britain on an industrial scale. The new Hess Products plant at Littleborough in Lancashire applies the very latest technique of fractional distillation for the production of pure fatty acids as developed by Armour and Company of Chicago

#### Also available on request

A folder showing the composition of the most common oils and fats



Write today for "THE CHEMISTRY OF FATTY ACIDS", a free technical bulletin describing fatty acids and their properties, reactions and possible derivatives. It covers natural and synthetic fatty acids . . . oxidation . . . polymerisation . . . hydrogenation . . . halogenation . . . sulphonation . . . salts of fatty acids . . . acyl halides . . . esters . . . acid anhydrides . . . ketenes . . . ketones . . . aldehydes . . . alcohols . . . amides . . . nitriles . . . amines

HESS PRODUCTS LIMITED • 4 ALBION STREET • LEEDS 1

# SHAWINIGAN LTD.

REG. TRADE MARK



MADE IN CANADA

VINYL ACETATE MONOMER  
POLYVINYL ACETATE "GELVA"  
POLYVINYL ACETAL "ALVAR"  
POLYVINYL FORMAL "FORMVAR"  
POLYVINYL BUTYRAL "BUTVAR"  
POLYVINYL ALCOHOL "SOLVAR"

**MARLOW HOUSE, LLOYDS AVENUE, LONDON, E.C.3**

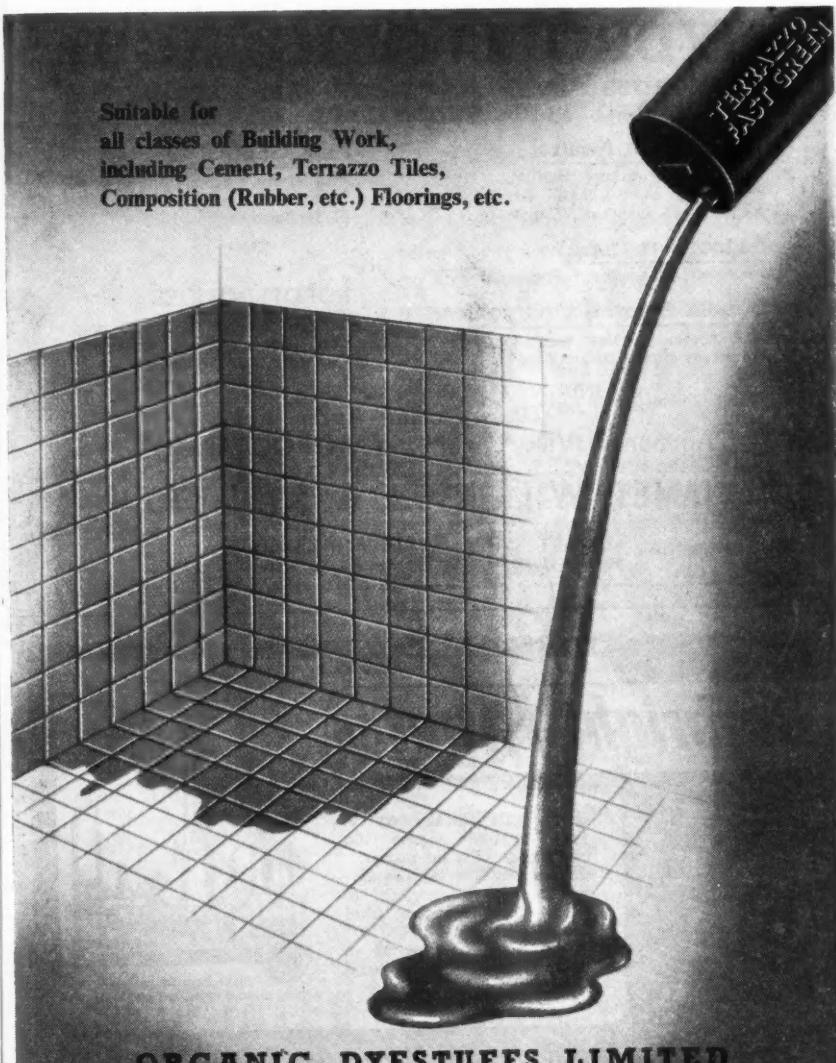
Telephone : ROYAL 6102/3/4

Telegrams: "IGANSHAWIN, FEN, LONDON"

# We specialize in the **RARER METALS**

THEIR ORES, ALLOYS, OXIDES & SALTS,  
AND THEIR LATEST APPLICATIONS

Suitable for  
all classes of Building Work,  
including Cement, Terrazzo Tiles,  
Composition (Rubber, etc.) Floorings, etc.



**ORGANIC DYESTUFFS LIMITED**

Pendleton, Salford 6, England

Telephone Dukinfield 4021

# HYDROFLUORIC ACID

**ANHYDROUS AND SOLUTIONS ALL STRENGTHS  
ALSO PURE REDISTILLED 40% w/w**

**FLUORIDES, Neutral**

Sodium, Magnesium, Barium,  
Potassium, Lead, Zinc, Ammonium,  
Aluminium Lithium, Chromium.

**BiFluorides (Acid)**

Ammonium Sodium, Potassium.

**Double Fluorides (Cryolites)**

Sodium HexafluAluminate  
Potassium HexafluAluminate

**SILICOFLUORIDES**

Magnesium, Zinc, Ammonium,  
Barium, Potassium, Lead,  
Hydrofluosilicic Acid.

**BOROFLUORIDES**

Sodium, Potassium, Ammonium,  
Lead, Copper, Zinc, Cadmium,  
Fluoboric Acid Solution.

OTHER FLUORIDES TO SPECIFICATIONS.

Glass Etching Acids

Ammonia White Acid and VITROGRAPHINE.

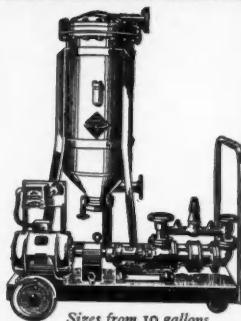
**JAMES WILKINSON & SON, LTD.**

**TINSLEY PARK ROAD, SHEFFIELD, 9**

'Phone 41208/9 'Grams "CHEMICALS" Sheffield

## Starbright Filtrates

In one mechanical operation the Metafilter filters out every trace of solid matter. Cleaning by reversal is equally simple — no filter cloths to clean — no expensive filter pads to replace. A sound engineering job in stainless steel — monel metal — copper or steel.

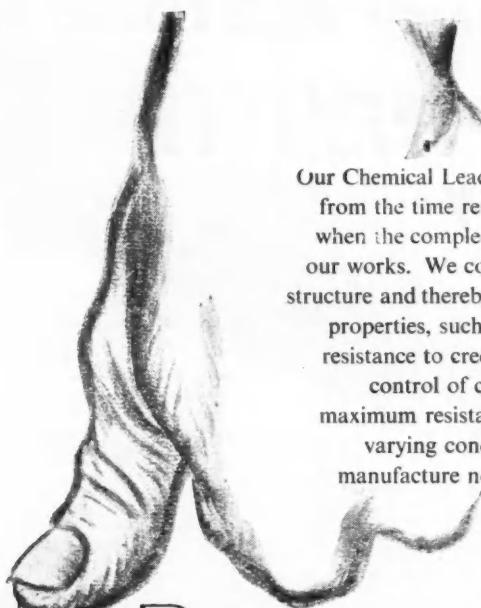


*Sizes from 10 gallons  
to 10,000 gallons per hour.*

## METAFILTRATION

THE METAFILTRATION COMPANY LIMITED, BELGRAVE ROAD, HOUNSLOW, MIDDLESEX

PHONE:  
HOUNSLOW 1121/2/3  
GRAMS:  
METAFILTER, HOUNSLION



Our Chemical Lead is under strict control from the time refining starts to the time when the completed sheet or pipe leaves our works. We control its grain size and structure and thereby govern its mechanical properties, such as tensile strength and resistance to creep and fatigue. Careful control of composition ensures the maximum resistance to corrosion under varying conditions. Throughout its manufacture no process is undertaken without testing before, during and after

## LEAD UNDER OUR THUMB

Two main types are manufactured, Type A and Type B. Chemical Lead Type A is pure Lead. Type B is Lead *plus* minute quantities of protective elements ; it has greater mechanical strength and may be preferable in many industrial processes. We are always pleased to help customers decide which is the better for their purpose. A helpful brochure on Chemical Lead is available on request.

## ASSOCIATED LEAD MANUFACTURERS LIMITED

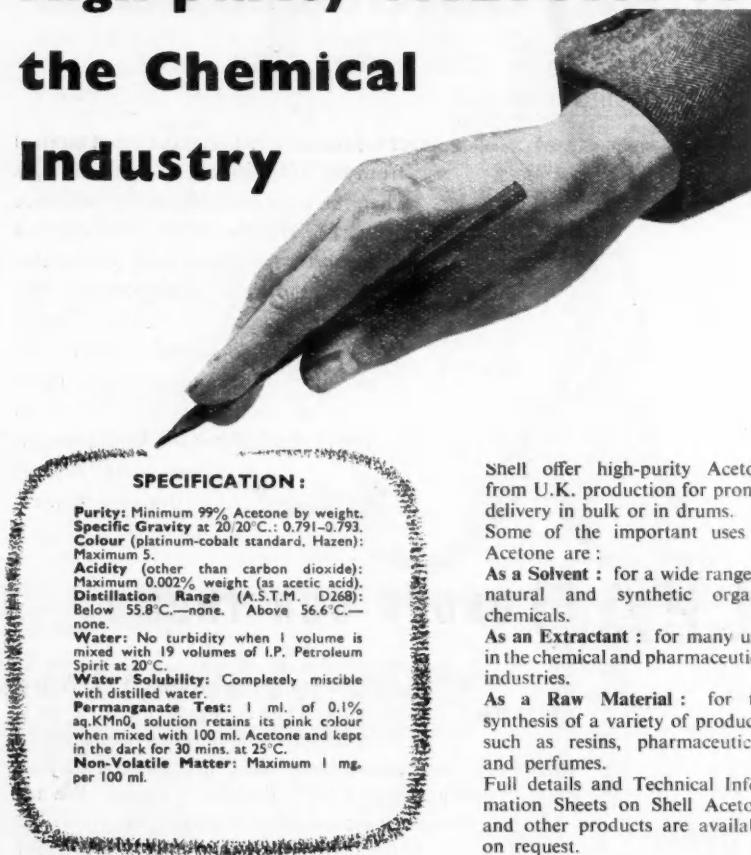
Ibex House, Minories, EC3  
LONDON

Crescent House,  
NEWCASTLE

Lead Works Lane,  
CHESTER



# High-purity ACETONE for the Chemical Industry



## SPECIFICATION :

**Purity:** Minimum 99% Acetone by weight.  
**Specific Gravity** at 20/20°C.: 0.791-0.793.  
**Colour** (platinum-cobalt standard, Hazen): Maximum 5.  
**Acidity** (other than carbon dioxide): Maximum 0.002% weight (as acetic acid).  
**Distillation Range** (A.S.T.M. D268): Below 55.8°C.—none. Above 56.6°C.—none.  
**Water:** No turbidity when 1 volume is mixed with 19 volumes of I.P. Petroleum Spirit at 20°C.  
**Water Solubility:** Completely miscible with distilled water.  
**Permanganate Test:** 1 ml. of 0.1% aq.  $KMnO_4$  solution retains its pink colour when mixed with 100 ml. Acetone and kept in the dark for 30 mins. at 25°C.  
**Non-Volatile Matter:** Maximum 1 mg. per 100 ml.

Shell offer high-purity Acetone from U.K. production for prompt delivery in bulk or in drums. Some of the important uses of Acetone are:

**As a Solvent:** for a wide range of natural and synthetic organic chemicals.

**As an Extractant:** for many uses in the chemical and pharmaceutical industries.

**As a Raw Material:** for the synthesis of a variety of products, such as resins, pharmaceuticals and perfumes.

Full details and Technical Information Sheets on Shell Acetone and other products are available on request.



# Shell Chemicals

SHELL CHEMICALS LIMITED 112, Strand, London, W.C.2 Telephone: Temple Bar 4455  
 (DISTRIBUTORS)

Divisional Offices:

Walter House, Bedford Street, London, W.C.2. Telephone: Temple Bar 4455  
 42, Deansgate, Manchester 3. Telephone: Deansgate 6451  
 King Edward House, New Street, Birmingham 2. Telephone: Midland 1742,  
 28, St. Enoch Square, Glasgow, C.I. Telephone: Glasgow Central 9561  
 53, Middle Abbey Street, Dublin. Telephone: Dublin 77810 K6

# The Chemical Age

*The Weekly Journal of Chemical Engineering and Industrial Chemistry*

BOUVERIE HOUSE 154 FLEET STREET LONDON E.C.4

Telegrams: ALLANGAS FLEET LONDON • Telephone: CENTRAL 3212 (26 lines)

Volume LXII

20 May 1950

Number 1610

## Growing Export of Chemical Plant

ONE of the more significant changes in United Kingdom trade returns indicated by the "breakdown" of the net adverse balance on current account has been the conversion of a United Kingdom surplus of £100 million with the OEEC countries in 1948 into a deficit of £20 million last year. This very rapid decline seems to have been due in part to the policy of "liberalising" trade.

It is generally accepted that a reduction of the restrictions and high tariff barriers that have impeded the natural course of international trade is vital to world prosperity. The substantial progress in this direction made in recent months represents a welcome constructive contribution towards the restoration of economic stability. Liberalisation of trade, however, is liable to be regarded with understandable misgivings by industries which have been called upon to attain high export levels and given a considerable measure of protection in the home market by the import control system. In favourable conditions, competition is invigorating and, theoretically at any rate, any adverse consequences on the home market should be offset by the potential opportunities for developing markets formerly closed to British goods. In the light of experi-

ence, however, liberalisation of trade is being viewed by some manufacturers with a certain amount of apprehension. While the total effect should be favourable, the progressive reduction of import restrictions may well have unwelcome results in certain industries, especially when the backlog of orders has been cleared.

How does liberalisation of trade affect the outlook for such a rapidly expanding industry as the manufacture of chemical and petroleum plant? The progress of this key industry has been one of the outstanding features of Britain's economic recovery since the war and its future welfare is obviously a matter of prime importance. Because their products are vital to the economies of other countries, British exporters of chemical plant have seldom been excluded from overseas markets by the restrictions applied to commodities of a less essential nature. Liberalisation is thus unlikely to be of very much assistance to that form of export trade.

Chemical plant has been included in the United Kingdom Open General Licence list only since January 5, so that there has not yet been sufficient time for the effects of liberalisation on the home market to become apparent. There seems, so far, to be little evidence

## On Other Pages

### Leader:

*Growing Export of Chemical Plant* 737

### Notes and Comments:

<i>I.C.I.'s Export Trading</i>	739
<i>Systemic Insecticides</i>	739
<i>Peat as a Power Source</i>	739
<i>Iodine</i>	740
<i>Need of Oil Plant</i>	741
<i>Business at the BIF</i>	741
<i>U.S. Sponsored Research</i>	741
<i>Sulphuric Acid Totals</i>	742
<i>Canada's Record Production</i>	742
<i>Traders' Rôle in Chemical Industry</i>	743
<i>The Chemist in Industry</i>	744
<i>Industrial and Research Instruments</i>	745
<i>Dyestuffs Changes</i>	746
<i>Parliamentary Topics</i>	746
<i>April's Lower Exports</i>	746
<i>Engineering Advances at Birmingham</i>	747
<i>Vitreous Enamel Failure</i>	750
<i>Ironfounding Progress</i>	750
<i>U.S. Hydrazine Production</i>	750
<i>New Centre of Medical Research</i>	750
<i>Fuller Scope for Coal Tar Research</i>	752
<i>A Possible Rival of Pyrethrum</i>	753
<i>U.S. Addition to Plastics Sources</i>	755
<i>The Chemist's Bookshelf</i>	756
<i>Technical Publications</i>	757
<i>Accuracy of the Chemical Balance</i>	758
<b>OVERSEAS CHEMISTRY AND INDUSTRY</b>	
<i>German Export Prospects</i>	759
<i>Increasing Mineral Yields in Egypt</i>	760
<i>South Africa's Material Sources</i>	761
<i>French Chemists Welcomed</i>	762
<i>Explosion Unexplained</i>	762

(The annual subscription to THE CHEMICAL AGE is 30s.; single copies, 9d.; post paid, 1s. SCOTTISH OFFICE: 116 Hope Street, Glasgow (Central 3970). MIDLANDS OFFICE: Daimler House, Paradise Street, Birmingham (Midland 0784-5). THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers, Limited

of increased competition from European sources, nor are there at present any disquieting elements in the changed position. Western Germany, being at present one of the hard currency countries, is still debarred from exporting to certain OEEC countries under open general licence, so that competition from this quarter is not likely to be unduly severe. Switzerland's is also a hard currency country, and Czechoslovakia cannot be regarded as a potential competitor so long as present conditions persist. Thus the only countries directly affected by trade liberalisation in this particular field are France and Belgium, whose production is not on a scale large enough to present any formidable challenge to British manufacturers at the present time.

Sooner or later, however, the return of Western Germany as a serious competitor will have to be faced. German manufacturers are losing no time in re-establishing their shattered industry and it is understood some 350 firms will be represented at the big exhibition of chemical plant which is to be held at Frankfurt in July. This exhibition should provide some indica-

tion of the progress being achieved. (THE CHEMICAL AGE, 62, 718). The extent of Britain's pre-war dependence on imported chemical plant has been greatly exaggerated, since a large proportion of the country's requirements has always been locally supplied. A considerable amount of plant, however, used to be imported from Continental sources and especially from Germany.

Today the home industry is in a very much stronger position and it is being noted that almost every type of plant built on the Continent can be produced here, independently or under certain licensing arrangements. The strength of the industry is steadily increasing and, despite the very great home demand, many firms are exporting on a large-scale and still expanding their scope overseas. Exports are at present running at about the 1949 level and there seems to be little doubt that last year's very satisfactory figure will be reached again. The dimensions of that trade are not precisely defined in the Board of Trade summaries because of the considerable range of categories in which chemical plant participates.

(continued on page 740)

746  
747  
750  
750  
750  
750  
752  
753  
755  
756  
757  
758  
759  
760  
761  
762  
762  
FICE:  
gham  
the  
ved.  
The  
ence  
been  
arge  
uire-  
d.  
how-  
rom  
ially  
very  
eing  
plant  
duced  
tain  
ngth  
sing  
ome  
y on  
heir  
sent  
and  
that  
will  
s of  
d in  
ause  
ries  
ates.

## Notes and Comments

### I.C.I.'s Export Trading

**I**N stimulating contrast with the sundry reports on economic affairs of the country as a whole is the annual report for 1949 of I.C.I., Ltd. The drawing of such a parallel is encouraged by the vast scope of the effort recalled by the industrial report, based as it is upon sales valued at £174.6 million (£10.6 million more than in 1948), and the fact that the overseas trade problems encountered were a faithful reflection of those in which national industries as a whole had to contend in 1949. The similarity of circumstances with somewhat similar reports by Government departments seems to end there. The I.C.I. report is in most respects a story of severe difficulties overcome or circumvented by flexible and rapid adaptation to new conditions. Greatly increased competition and some insurmountable barriers, notably to the Indian and Argentine markets, have characterised the export field, but I.C.I.'s direct exports remained at the same high level as in 1948 (58 per cent more than pre-war) and the total value, £38,384,000, was nearly £1 million larger than in the year before. The report does not evade the prospect that it will require the utmost exercise of adaptability, the power to innovate and possibly to reduce prices to preserve this high level of British chemical exports in the next 12 months. It is in these conditions that I.C.I.'s more or less intimate participation in foreign economies through subsidiaries and associates promises to secure the results which trade talks between Governments and international agreements so frequently fail to attain.

### Systemic Insecticides

**D**URING the recent inauguration of the Crop Protection Panel, Agriculture Group, of the Society of Chemical Industry, at the Royal Institution, Dr. Hubert Martin, of Long Ashton Research Station, read

an interesting paper on "Advances in Crop Protection." In the field of research related to the phosphorus fluorine compounds as systemic insecticides for crops, and of Parathion insecticidal compounds, an account was given of recent advances in changing molecular structure with the aim of making these poisons safe to use on food crops. He pointed out that toxicity had been reduced and that certain compounds were to some extent selective, so that a pest might be destroyed, while useful insects, such as the ladybird, may be unaffected. He expressed confidence that systemic compounds would ultimately be produced which would not be dangerous to man. Meanwhile, compounds were being marketed which were still dangerous unless the utmost care was taken to follow printed directions. Parathion smokes were dangerous, though it is considered by many that they are not more dangerous than the older practice of using cyanide. Of greater interest in the systemic field, was the possible manufacture and synthesis of hormone substances and antitoxins which could be used in the same way against fungoid diseases, rendering the plant immune and inhibiting the germination of spore. The nature of the toxins which fungi produce within plants is gradually being revealed, affording hope that means may be found of neutralising them by therapeutic treatment in a way that would be harmless to man.

### Peat as a Power Source

**C**AUTION—to some it may appear as excessive caution—has characterised the programme to develop the great fuel, and possibly chemical, resources of the Scottish peat bogs. The high hopes raised shortly after the war and the impressive body of expert evidence that was mustered then seem to have met with a measure of frustration, hard to explain in the light of

the manifest need to make use of all economical sources of energy. There are now belated evidences of a promising kind that intelligent use of one of the newer dynamic factors—the gas turbine—is to be made to make profitable use of Scotland's great natural asset. The Government White Paper on Scottish industry makes guarded reference to the possibilities of adapting to peat burning a 15,000 kW closed cycle gas turbine now being developed. It is thought, however, that the open cycle unit may serve the Scottish conditions better because it would deal satisfactorily with the high moisture content, which is likely to prove the chief limiting factor in any attempt to employ peat in more traditional combustion methods. In such a gas turbine the incidental generation of steam as well as gas in the carbonisation may indeed enhance the capacity of the plant. Gas turbine installations in the peat areas might go far to overcome one of the other principal impediments to economic peat utilisation—relatively costly transport—by consuming the fuel on or near the site. Harder to explain than the halting progress made in this sphere as a whole is the continued absence of any firm evidence that the North of Scotland Hydro-Electric Board, in whose territory most of the major peat areas lie, has any plans to co-operate in research and practical tests of peat as a source of electric power.

### Iodine

THE immensity of the task of searching the relevant literature in the course of almost any chemical research is called to mind by the scope of one new work offered this week, which deals with only one aspect of one substance, iodine in its relation with plant life. This, it has to be borne in mind, as a subject is no more than a stripling when compared with some of the traditional materials of chemistry; the story had its beginning as recently as 1811 when Bernard Curtois identified iodine in seaweed ash. In 138 years there have been published more than 800 major studies of the bearing of iodine in plant life, which is, of

course, only a small part of the story of iodine. The producers in London of "Iodine and Plant Life," the Chilean Iodine Educational Bureau, estimate that the world's literature can offer more than 30,000 papers concerned with iodine in biology and medicine, and they have courageously undertaken the task of collating and annotating in an orderly sequence the bibliography of the whole. The bureau does not pretend that even this impressively comprehensive looking volume, admirably cross indexed and sectionalised, is the last word on the subject. It is merely "all references the bureau has been able to discover relating to fundamental and applied knowledge of iodine and vegetable life—marine flora, land plants, bacteria and fungi." Complete or not, it is an addition of permanent value to chemical bibliography and a further token of the essential service rendered by devoted abstractors and special libraries.

### GROWING EXPORT OF CHEMICAL PLANT

(continued from page 738)

A relevant fact, however, is the recorded increase in the value of gas and chemical machinery exports from £2.2 million in 1948 to £3.66 million last year. Equivalent sales in 1947 produced only £991,748.

There has been an appreciable improvement in the supply of labour and materials, and manufacturers exhibiting at the BIF at Castle Bromwich have generally been able to quote more realistic delivery dates. In this they have been assisted by a corresponding improvement in other industries, which has greatly reduced the delay resulting from shortage of such items as, for example, electric motors.

While it is impossible to forecast the ultimate consequences of liberating trade, there seems to be no cause for anxiety in regard to the immediate future. In view of the growing productive capacity of the industry and its widened export field even the ultimate re-emergence of powerful competition from Germany may not give much cause for alarm.

## BUSINESS AT THE BIF

### London Estimates of Results

STATEMENTS this week by representatives of the industry at the chemicals section at Olympia indicate that, although the volume of inquiry from overseas has been rather less this year, there has been a greater proportion of solid business interest. Laporte Chemicals, Ltd., for instance, believes that the majority of inquiries it received were of the kind from which profitable results can be expected.

Buyers, however, are more selective, demand early delivery dates and a firm price to enable them to obtain import licences. The same has been reported in the engineering sections at Birmingham.

In the opinion of another company, this year's BIF has been the best since the war. It was more than satisfied that the fair was of great value to chemical industry, which does not generally look for much immediate result in the form of direct orders negotiated during the fair. Nearly all exhibitors agree, however, that it is impossible yet to give any accurate appraisal of the business which may be attributable to the fair. It is common for several years to elapse before the full benefit of contacts made during two weeks in London is translated into tangible results. Chemical manufacturers deem highly important the establishment of friendly relations with their customers and co-workers abroad, and their policy at the BIF has again been guided by this principle.

The demand for plasticisers and solvents has, as expected, been high. One company expressed the wish that more could be exported, to build up goodwill for the years when competition will be keener. To-day the Government gives the home motor vehicles industry a prior claim for solvents, where they serve only as indirect exports. The coal tar products are also insufficient to meet the needs of the rapidly expanding plastics industry.

Kemball Bishop & Co., Ltd., had been able to accept all orders for the wide range of acids produced, except citric acid, the demand for which now exceeds supply.

### More Coal: Fewer Miners

Production of coal last week showed a slight improvement to 4,888,800 tons (4,217,700 tons the week before), consisting of 4,111,800 tons deepmined and 276,500 tons opencast. There was a further reduction of 600 in colliery workers in the week ended May 6.

## NEED FOR OIL PLANT

### "Shipbuilders Reluctant to Help"

SIR MARK HODGSON, chairman of the Northern Regional Board for Industry, said at a Press conference at Newcastle-on-Tyne last week that the board had been seeking for nearly a year to interest shipbuilders in a scheme for manufacturing certain types of petroleum equipment as a sideline.

There was a demand, which the Americans were trying to meet, for large-diameter fabricated pipes and other items for the Middle East oilfields, and as there was some unemployment among shipbuilding and ship-repairing workers in the North-east the board had felt that the introduction of a new industry would "take up the slack." Shipbuilders seemed reluctant to take up the idea, probably because they had a fair amount of shipbuilding work in hand.

"It will be a pity if we wake up two or three years hence and find that we have missed the boat," he said. "I feel we may have to go to other industries for the work. British oil companies want it to be done in this country because it would be a dollar saver."

Local shipbuilders' associations were still considering the matter, he said, and a final reply from them was expected soon.

[The frequent inability of some suppliers of petroleum equipment to provide essential components within the period specified was recently alleged by representatives of one of the large petroleum companies (THE CHEMICAL AGE, 52, 169.)]

## U.S. Sponsored Research

TWELVE new contracts for the performance of physical research were awarded to 12 institutions in the U.S.A., the district of Colombia and Puerto Rico, by the U.S. Atomic Energy Commission during the first quarter of 1950. They are worth \$1,845,660.

Fields of work include studies of the fluorides of the rare earth elements; measurement of metal dissolution rates in aqueous solutions of acids and oxidising agents; research on polarography of organic compounds; "hot" atom chemistry and isotopic exchange reactions; synthesis and properties of ion exchange resins; inorganic fluorides; low latitude cosmic ray studies; and polarographic diffusion.

A \$1.25 million project to design, construct and operate a 1000 m.e.v. synchrotron at the California Institute of Technology was the largest contract.

## Sulphuric Acid Totals

### Greater Production and Consumption in the First Quarter

THE production of sulphuric acid and oleum in the United Kingdom in the first quarter of 1950 was 449,085 tons, an increase of 18,895 tons on the figure for the previous quarter. The amount produced by the chamber method (188,589 tons) was 1298 tons less, but the contact process was responsible for 265,496 tons, 15,193 tons more than in October-December, 1949. Consumption, 461,094 tons, was also greater by 18,146 tons.

Increased use, in tons, by individual industries was particularly marked in: dyestuffs, 22,007 (previous quarter 18,816); rayon and transparent paper, 57,001 (51,978); superphosphates, 123,618 (121,545); sulphate of ammonia, 66,884 (63,815); paint and lithopone, 32,006 (30,860); oil refining and petroleum products, 14,886 (13,906).

The full details of production, consumption and stocks, etc., issued by the National Sulphuric Acid Association, Ltd., are contained in the accompanying table.

#### PRODUCTION OF SULPHURIC ACID AND OLEUM.

(Tons of 100%  $H_2SO_4$ )

	Chamber only	Contact only	Chamber and Contact	
Stock Jan. 1, 1950	33,713	31,704	65,417	
Production	183,589	265,496	449,085	
Receipts	52,774	13,514	66,288	
Oleum feed		2,953	2,953	
Adjustments	—269	+112	—157	
Use	115,530	105,583	221,113	
Despatches	125,611	178,906	304,517	
Stock Mar. 31, 1950	28,666	29,290	57,956	
Total capacity represented	201,070	275,600	476,670	
Percentage production	91.3%	96.3%	94.2%	

#### CONSUMPTION—UNITED KINGDOM

Trade Uses	Tons 100% $H_2SO_4$
Accumulators	2,447
Agricultural purposes	139
Bichromate and chromic acid	2,862
Bromine	2,646
Clays (fuller's earth, etc.)	2,833
Copper pickling	607
Dealers	5,143
Drugs and fine chemicals	2,862
Dyestuffs and intermediates	22,007
Explosives	3,568
Export	1,026
Glue, gelatine and size	100
Hydrochloric acid	17,140
Hydrofluoric acid	2,294
Iron pickling (incl. tin plate)	25,410
Leather	1,778
Metal extraction	626

Oil refining and petroleum products	14,886
Oil (vegetable) ...	2,933
Paint and lithopone	32,006
Paper, etc.	904
Phosphates (Industrial) ...	1,085
Plastics, not otherwise classified	5,023
Rayon and transparent paper	57,001
Sewage	2,683
Soap and glycerine	3,041
Sugar refining	141
Sulphate of ammonia	66,884
Sulphates of copper, nickel, etc.	6,068
Sulphate of magnesium	1,628
Superphosphates	123,618
Tar and benzole	4,672
Textile uses	6,587
Unclassified:	
Borax and boracic acid	
Chlorsulphide acid	
Formic acid	
Oxalic, tartaric and citric acids	
Phenol (synthetic)	
Rare earths	
Sulphate of alumina	
Sulphate of barium	
Sulphate of zinc and others	
Total	461,094

#### RAW MATERIALS

Tons

	Zinc	Spent Sulphur	Concen-	Anhy-
	Pyrites	Oxide	trates	drift
Stock Jan. 1,				
1950	53,637	179,277	67,749	39,250
Receipts	71,788	57,224	79,626	31,205
Adjustments	—1,535	—422	+391	—57
Use	55,984	49,966	86,212	45,474
Despatches	287	3,530	364	9
Stock Mar. 31,			149*	63*
1950	67,619	182,434	61,127	24,915

\* Used at works for purposes other than sulphuric acid manufacture.

### Canada's Record Production

PRODUCTION of sulphuric acid in Canada in 1949 was 705,000 tons, a record total and 26,000 tons greater than in 1948. The apparent consumption during the year was 687,700 tons (650,000 in 1948).

Exports of sulphuric acid in 1949 amounted to 17,336 tons, a decrease of 29,478 tons. Imports were 24 tons, compared with 59 tons a year earlier.

The consumption of sulphuric acid by the fertilisers industry in 1948—the largest user—amounted to 467,000 tons, (472,500 tons in 1947). In the heavy chemicals industry, 59,000 tons were used in 1948, in the coke and gas industry 35,200 tons, iron and steel 20,800 tons, explosives 19,700 tons, petroleum refining 19,600 tons, and textiles 12,500 tons.

## TRADERS' RÔLE IN CHEMICAL INDUSTRY

### Association Chairman on Efficient Distribution

THE essential nature of the services of the merchant in the maintenance on the widest basis of a balanced trade in British industrial chemicals was stressed by the chairman (Mr. C. Norton Stafford) speaking at the annual meeting in London on May 17 of the British Chemical and Dyestuffs Traders' Association.

The chairman, presenting the annual report, touched on some of the many instances in which the intervention by the association had served to facilitate conditions of exchange and transport.

The merchant, he said, had continued to make a very substantial contribution to the United Kingdom export trade in chemicals and the distribution system on the home market continued to be based on the efficient merchanting organisations. These points were emphasised because there was much confused thought with regard to the services of the merchant. If they were to accept the view of some manufacturers, as put forward in the "Report on the Chemical Industry, 1949," the ordinary chemical merchant had almost ceased to exist. That view may have been due to short-sighted thinking, and certainly to an absence of any real knowledge of the position.

#### Traditional Pattern of Trade

The fact was that Great Britain had always maintained her population by the ability of her merchants to sell the products of the homeland, and with that trade as a foundation to proceed to sell also in the world markets the products of other countries. It was strange that at a time when the country needed more than ever before to increase its world trade that some manufacturers should ignore the vital trading asset built up by British merchants. If the merchanting system were to disappear, conditions would inevitably lead to State or private monopolies, and that would mean narrower markets and restricted choice, with a consequent fall in living standards.

Happily, many British chemical manufacturers were finding the services of merchants most useful, and with their continued co-operation, merchants would more than hold their own in the highly competitive markets which were now developing throughout the world.

Success in meeting foreign competition depended very largely on the comparative

efficiency of British industry. It was in savings in production costs, rather than in distributors' margins, that the answer could be found.

The policy of the nationalised undertakings with regard to the services of merchants was a question receiving the consideration of the council from time to time, and should it again be necessary, discussions would be re-opened with the appropriate authority.

Members would be interested to know that a contact between the association and a body representing chemical merchants in Australia has been established with a view to facilitating an approach to any question which might arise out of the trade in chemicals between Australia and the United Kingdom.

#### National Affairs

The chairman, reviewing some of the association's work during the year as an advisor on Government policy in relation to chemical trading, recalled its collaboration in revising the Key Industry Duty list for exemptions. A number of items of which there had been no imports for many years were deleted.

The commercial relations and exports department of the Board of Trade had invited the co-operation of the association in connection with the international negotiations, which begin in September, for a general agreement on tariffs and trade. The association welcomed any movement which seeks the mitigation of restrictions hampering international trade, and the removal of artificial trade barriers.

An open general import licence was issued during the year covering a whole range of chemicals, and it was hoped that the time was not far distant when the licensing system for regulating imports and exports could be abandoned. Another move towards freer conditions was the reduction in the number of controls operative in the chemical trade.

Cordial relationships continued to be maintained with the various Government departments, and a high measure of co-operation has been attained in the negotiations conducted on behalf of members.

The rising costs of distribution were frequently the subject of criticism by would-be planners who failed to recognise the connection between such costs and the higher charges for the transport and hand-

## THE CHEMIST IN INDUSTRY

### His Status in a Large Organisation

THE possibility that the individualism of the chemist may be suppressed in a large industrial concern was one of the problems discussed at a meeting of the London and South-Eastern Counties Section of the Royal Institute of Chemistry held in London last March.

The original intention had been to discuss the subject in a general manner. As, however, this had already been done in a number of recent addresses to scientific bodies and in articles in chemical journals, it was decided to examine the organisation of one specific organisation.

A paper on "The Function of the Chemist in a Large Industrial Organisation," was accordingly read by Dr. John Dewar, of the central staff department, I.C.I., Ltd.

In a description of the structure of the company special attention was paid to the varied activities and interests of the constituent parts of the I.C.I. organisation and to the system of central co-ordination of functions.

The method used to introduce entrant graduate chemists to industrial life was outlined, and examples of the types of investigation normally encountered by them were quoted.

The nature of research, development, production, sales, technical service and other work undertaken by I.C.I. chemists was discussed, and an indication given of the technical qualifications and personal qualities required for success in those spheres of operation.

Statistical information was given about the number, distribution and functions of the qualified technical staff in the company, with special reference to the post occupied by chemists.

#### "Terrifying Machine"

In the discussion which followed, Dr. M. A. Phillips said that his impression of the I.C.I. organisation was that it was "magnificent, but somewhat terrifying." Was there room for initiative? Was there really any decentralisation? The possibility of nationalisation of the chemical industry had been rumoured—perhaps in such an event the civil servants would have the more to fear in being drawn into this terrifying machine.

Dr. Dewar, in reply, referred to his elaboration of the fact that the manufacturing divisions of I.C.I., although not separate legal entities, have much of the

character of individual industrial enterprises, common functions being co-ordinated in varying degrees by a central organisation.

After the initial period of concentrated centralisation a policy of decentralisation had been adopted. Organisational improvements were constantly under review to find the best blend of centralised authority and delegated responsibility.

This point was also dealt with by Dr. C. W. Herd, who presided. The doctor declared that among the many senior and some junior chemists he had met he had never observed the "terror" expected by Dr. Phillips, nor had he heard them complain that they were "just cogs."

The assistance which I.C.I. gave to smaller firms was also acknowledged by the chairman, who said he thought the company's policy was to foster the progress of chemical industry in general.

Prof. Hermann Schmidt-Hebbel, of the biochemistry department of Chile University, was one of the 90 chemists who attended the meeting.

#### MERCHANT SERVICES

(continued from previous page)

ling of goods. Traders could only view with misgiving the ultimate outcome of a policy which accepted an increased wage rate side by side with a reduced output per man hour and often poor service. In one instance reported to the association the charges made for re-packing goods for export were nearly six times greater than they should have been, not because the wage rate was higher, but because the work which should have been completed in one hour had taken six hours.

The unnecessary loss of goods through damage in handling was another matter over which the authorities appeared to have been losing control. It had been necessary for the association to make representations to the National Dock Labour Board asking that the use of hooks in the process of loading and discharging bag cargoes should be discontinued. The action taken by the association was supported by many other trade bodies.

The meeting elected the following officers:—President, Mr. G. S. Baché; vice-president, Mr. C. W. Lovegrove; chairman, Mr. C. Norton Stafford; vice-chairman, Mr. C. H. Wilson; hon. treasurer, Mr. L. S. Heskins; executive council, Messrs. C. C. Hallett, Ian D. Orr, D. F. Waugh; hon. auditor, Mr. R. Heap, F.C.R.A.

## INDUSTRIAL & RESEARCH INSTRUMENTS

### Royal Society Illustrates Recent Advances

EVIDENCE of advances in the production of new means of identification and measurement in a variety of fields was offered at this year's annual conversazione of the Royal Society, at Burlington House, London, W.1, last week. A number of the principal research departments of the universities and industry made distinguished contributions to the exhibition which is associated with the function.

An infra-red spectrometer, shown in operation by the Anglo-Iranian Oil Co., Ltd., has been developed by that company in collaboration with Marconi Instruments, Ltd., and is the first of its kind to be used in industry.

The instrument is being used to investigate catalysts for the desulphurisation of petroleum products. In the present application, a stream of hydrocarbons containing thiophene is passed in admixture with hydrogen over the catalyst and then through the absorption cell of the spectrometer. The variation of thiophene content is followed by the change in the spectrum trace on the cathode-ray screen.

Research scientists of the General Electric Co., Ltd., have developed some new phosphors, responsive to 2537 Å radiation, which enable white light, suitable for general lighting, to be obtained from a single fluorescent material. The phosphors, which were demonstrated by the company, are of alkaline earth halophosphate composition, activated by antimony and manganese.

#### Pure Metals

A method of preparing iron and iron alloys of high purity on a 25-lb. scale was described by the Metallurgy Division of the National Physical Laboratory.

The base material, a Swedish iron of low metallic impurity, is melted in air in a basic-lined furnace. The carbon, silicon, chromium, manganese and sulphur are reduced to less than 0.01 per cent, but the oxygen content is greatly increased. The oxidised iron is remelted in pure aluminium crucibles in an atmosphere of dry hydrogen which reduces the oxygen and nitrogen contents to 0.002 per cent, or less. The purified molten iron is then cast in a steel mould, the hydrogen pressure having been lowered to about 6 cm. of Hg. Rolled to a bar of  $\frac{1}{2}$  in. diameter, the ingot supplies sufficient material for a wide series of tests.



[Courtesy of Anglo-Iranian Oil Co., Ltd., and Marconi Instruments, Ltd.]

*The new infra-red spectrometer employing cathode-ray presentation*

An interferometer microscope was contributed by Mr. J. Dyson, of Associated Electrical Industries, Ltd. Two fields of view, one containing the image of the light source, the other the image of the light source with the image superimposed, are brought into coincidence and the object is revealed by the effect of its optical thickness on the interference phenomena which are produced.

A portable leak detector, demonstrated by the British Thomson-Houston Co., Ltd., is used to discover traces of halogen vapour and is said to have many industrial applications. Its operation is based on the increase in positive ion formation at a heated platinum surface when the halogen concentration in the surrounding air increases. The flexibility of the instrument is indicated by its ability to detect 0.01 per cent trichlorethylene in mineral oil.

The high speed electronic camera which was the exhibit of the Department of Physical Chemistry, Cambridge, can show detail occurring in  $10^{-8}$  to  $10^{-5}$  sec.

An image converter tube has been used to take photographs of the same general form as those obtained from drum cameras. The display of the event as a function of time has been achieved by electronic deflection of the electron stream. The method is stated to give better resolution, higher useful intensity, and writing speeds 100 times faster than formerly attainable.

## PARLIAMENTARY TOPICS

REPLYING to a question regarding the hazards involved in the use of insecticides based on the organic phosphorus compound, parathion, Mr. T. Williams, Minister of Agriculture, said that every opportunity was being taken through the National Agricultural Advisory Service and the Press to make known the dangers of these substances and how they might be avoided. If these were heeded, together with the manufacturers' instructions, there should be no danger either to users or consumers. Compulsory provision of protective clothing for those using dangerous sprays was, however, one of the recommendations of the Gowers' Committee. The situation was, nevertheless, being closely watched by the Agricultural Research Council, which was in close touch with the Medical Research Council at the Ministry's Plant Pathological Laboratory.

INFECTION by bacteria of a product named Edifas, formerly called Cellofas edible grade, manufactured by Imperial Chemical Industries, Ltd., was alleged by Mr. J. McGovern, who alleged this material supplied to bakers was dangerous to health and asked the Minister of Health to take steps to prohibit its use. Mr. F. Willey, Parliamentary Secretary, in reply, said that there was no reason to believe there was any danger to health in use of Edifas. All foodstuffs contained bacteria, and there was no particular significance in the allegation. If more specific information was supplied, he would look into the matter.

REPLYING to questions about the maximum capacity of the British-owned refineries at Haifa, Mr. P. Noel Baker, Minister of Fuel and Power, said that in normal conditions about four million tons of crude oil could be treated in a year. American companies had a right to about one quarter of the products. The value of the British share at present f.o.b. prices, was about £17.5 million in 1947, and about £600,000 in 1949.

ASKED what was the percentage rise in the cost of imports of raw materials and manufactured goods since September, 1949, Mr. H. Rhodes said, on behalf of the Board of Trade, that index numbers of import prices in terms of sterling showed increases between September, 1949 and March, 1950 of 22 per cent (raw materials) and 17½ per cent (manufactured goods).

## DYES & TUFFS CHANGES

THE announcement that the Depth of Shade Control Order will be lifted from June 1 should mean a greater variety in depth of the four basic dark shades of dyestuffs—brown, navy, olive and wine, and black. Whether or not this will provide more choice for the consumer is in the hands of the dyers. Certain dye works have followed their own inclinations during the control period, using darker shades than specified.

Darker shades, increase the cost of production. They are, however, available in cheap dyes, which do not stand the test of time, and are dull and flat in appearance. It is the brightness of the tone which creates high prices and puts the finishing touch to the shade. The cheaper shades, produced more prolifically, do not necessarily stand up to test for colour fastness. So costs may rise slightly for better class dyes and finishes.

Criticism from overseas markets on the stability of dyes is being voiced in countries where Japanese textiles can be obtained at cheaper prices, and where wage problems are negligible.

### April's Lower Exports

THE value of United Kingdom exports in April is provisionally estimated to have been £150 million. Owing to the Easter holidays, the month contained only 23 Customs working days, however, and, adjusted to a standard month of 26 days, the total would be £169.5 million.

This was £4.5 million less than the average in the first quarter of this year, but 12 per cent above the average of £151.5 million for 1949. Exports to the U.S.A., adjusted to a standard month of 26 working days, were the lowest since last October.

Imports in April were provisionally valued at £211 million and re-exports at £6 million, so that excess of imports (valued c.i.f.) over exports and re-exports (valued f.o.b.) was £55 million. Adverse visible balance for the first four months was approximately £125 million.

### Lead Prices Raised

Further increases in the price of good soft pig lead were announced by the Ministry of Supply last week. The first rise of £2 a ton was announced on Wednesday, May 10 and was followed the next day by an immediate increase of £4 a ton, delivered, bringing the price from £92 to £96 a ton.

CRE  
Brom  
BIF.  
bered  
in 19  
these  
of cl  
sever  
mach  
other  
Mo  
equi  
less  
meta  
porce  
labor  
A m  
num  
ther  
A m  
made  
over  
on  
stan  
ber a  
  
From  
mod  
plan  
for  
glac  
Cent  
pilote  
nium  
extr  
can  
pres  
from  
spr  
scrub  
rigid  
alat  
ft. e  
high  
suit  
vo

## ENGINEERING ADVANCES AT BIRMINGHAM

### Plastics and Chemical Machinery at the BIF

**C**HEMICAL engineering was again well represented in the exhibits at the Castle Bromwich (Birmingham) section of the BIF. Engineering exhibits generally numbered more than last year—486 against 432 in 1949—and a fairly large proportion of these was wholly or in part for the service of chemical and allied industries. On several stands were erected full-scale machines and chemical equipment, on others, scale models were shown.

Most forms of chemical machinery and equipment were represented in the comprehensive exhibits—chemical plant in stainless steel, copper, aluminium and other metals, and glass, pumps, stoneware, and porcelain plant, tanks and tank linings, laboratory instruments—to mention a few. A modern note was struck by the larger number of plastics machinery exhibits; there were 19 of various sorts.

A reporter of **THE CHEMICAL AGE**, who made a tour of the Birmingham fair last week, heard encouraging accounts of good overseas business having been transacted on some of the chemical engineering stands. In practically all cases the number and character of the inquiries received

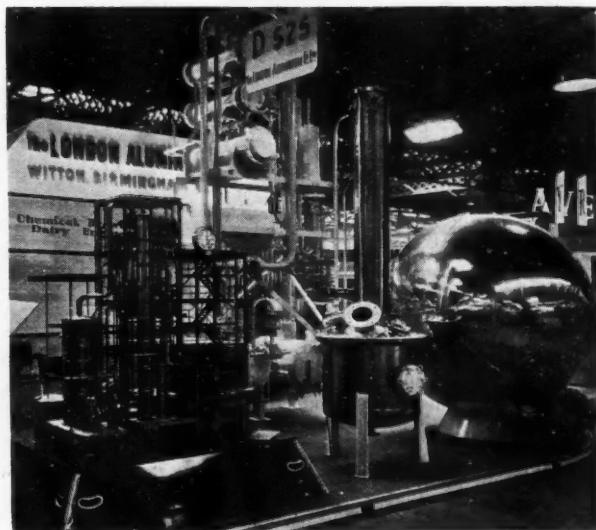
was regarded as very satisfactory particularly on the early days. One firm of plastic injection moulding machine makers reported having booked £20,000 worth of home and overseas business in the first two days of the fair. An interesting order from the Continent was from the municipality of Amsterdam for a £5000 magnetic coal separating plant to be used in a new power station.

Buyers from many countries, including Russia, visited the chemical engineering and other stands, and commendation was expressed of the quality of the current engineering products. One of the parties of overseas buyers was from the Hashimite Kingdom of Jordan.

\* \* \*

**P**ERHAPS the most spectacular of any of the chemical plant exhibits, and one which attracted considerable attention from visitors, was the assembly of large-scale plants by the **LONDON ALUMINIUM CO., LTD.** One scale model, in aluminium, was of a Diamond plant for the recovery of glacial acetic acid. A central position was given to a Merz pilot-scale plant, also in aluminium,

Front left: Scale model of "Diamond" plant, in aluminium, for the recovery of glacial acetic acid. Centre back: Merz pilot plant, in aluminium, for solvent extraction of sugar can wax from filter press mud. Centre front: Stainless steel spray column for gas scrubbing. Extreme right: Hand-made aluminium sphere, 6 ft. 6 in. diameter, for high voltage tests, suitable for 2 million volts gas testing.

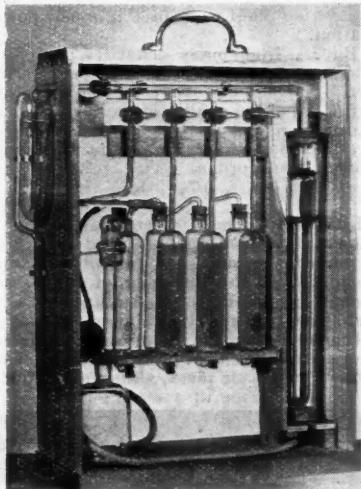


[Courtesy of the London Aluminium Co., Ltd.]

for the solvent extraction of oils, fats and waxes. This plant was specially designed for the extraction of sugar cane wax from filter press material. On the corner of the stand was a large aluminium sphere for high voltage testing. This, 6 ft. 6 in. in diameter, hand-made throughout, is suitable for 2 million volts gap testing.

\* \* \*

SEVERAL full-scale items of scientific glass equipment were shown by GLASS DEVELOPMENTS, LTD. These included the



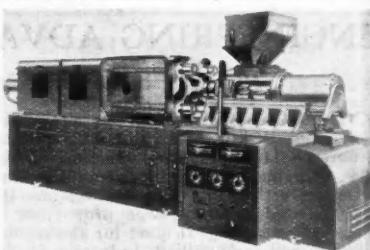
Orsat lung apparatus for analysis of carbon monoxide and dioxide, hydrogen, and oxygen (Glass Developments, Ltd.)

portable Orsat lung apparatus for analysis of carbon dioxide and carbon monoxide, hydrogen and oxygen. This is provided with four Stanier pipettes, spirit lamp with adjustable holder, and palladium-asbestos capillary tube, the whole being contained in a mahogany case.

Also shown was the Haldane gas analysis set—hydraulic pattern—which has needle valve control and is mounted on opal Perspex panel; the Haldane mine-air analysis apparatus and numerous examples and photographs of the firm's productions of laboratory furniture and equipment.

\* \* \*

AMONG the exhibits of plastics machinery, that of R. H. WINDSOR, LTD., attracted notice by the fact that it included a full-scale injection moulding machine of which working demonstrations were given.



Model S.H.8/10 plastic injection moulding machine, with an hourly plasticising capacity of 50-60 lb. (R. H. Windsor, Ltd.)

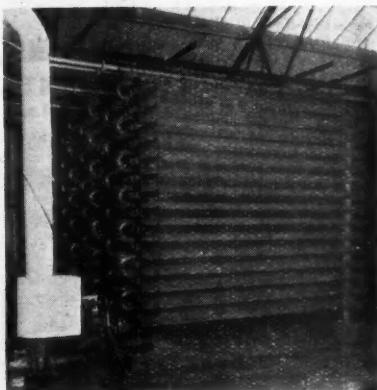
This machine moulds eight to ten oz. per shot, and the plasticising capacity is 50-60 lb. per hour. The total injection pressure is 114,000 lb., and the pressure on material 20,000 lb. p.s.i. The machine requires a floor space of 18 ft. by 3 ft.

\* \* \*

SHOWN on the stand of E.M.B. CO., LTD., was an injection moulding machine claimed to be capable of moulding all available thermo-plastic materials. It is powered by compressed air, and has a timed injection cycle which is said to prevent scamped mouldings. This timing device is now the standard equipment of this design.

\* \* \*

ONE and two ounce capacity plastics injection moulding machines were in the exhibit of HUFFIELD BROS., LTD. These are self-



[Courtesy of James Jobling & Co. Ltd.]

Part of one of the large capacity spray evaporators or coolers being produced in Perspex glass

contained, semi-automatic, and hydraulically operated. The plasticising capacity of the 1-oz. machine is 9 lb. per hour, and of the 2-oz. 16 lb.

\* \* \*

THE greater part of the stand of THOMPSON BROS. (BILSTON), LTD., was occupied by a large solid stainless steel inner shell of a trough-type horizontal jacketed mixer. With dimensions 20 ft. long by 10 ft. deep by 8 ft. wide, it was believed to be the largest single exhibit in the Castle Bromwich section. This shell varies in thickness from  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in. and is internally polished. The total finished weight is 45 tons. Alongside was the shaft of this mixer, which attracted attention by the fact that it was built up from a mild steel forging and covered with stainless steel. Other fusion welded items for the chemical and allied trades included a mild steel pan lined with pigmented phenolic lacquer.

\* \* \*

ON the stand of PRODORITE, LTD., which specialises in proofing processes in acid-proofing processes and proofing materials for all industries, was a scale model of a continuous strip pickling plant which this firm is shortly to install in the works of the Steel Company of Wales. Typical of the kind of work for which there is now an increasing demand were the acid-proofed sections of brick-built plant, treated floors and wall surfaces, tanks, pipes, etc., and samples of acid- and alkali-resisting cements and paints.

\* \* \*

A LARGE-SCALE model of chemical stoneware fume absorption towers on the stand of DOULTON & CO., LTD., was the replica of one in use at the works of Evans Medical Supplies, Ltd., Speke, Liverpool. Also shown here was a wide range of other chemical stoneware articles and laboratory



A group of laboratory items in porcelain shown by Doulton and Co., Ltd.



Demonstrating the services to the glass worker of some of the principal supplies offered by Chance Brothers, Ltd.: the demonstrator here uses a Flamemaster torch and Neodex lenses to protect his eyes from the glare of the sodium flame as he moulds the neck on to a large Hysil flask

porcelain ware, and many examples of high tension and other industrial insulators in porcelain.

\* \* \*

IN addition to showing a representative range of its standard temperature measuring instruments, draught and pressure gauges, recorders, etc., THE CAMBRIDGE INSTRUMENT CO., LTD., was handling inquiries for a new direct-reading pH indicator which is in course of development. This will be characterised by portability, robustness and great stability, and will record the full range of 0 to 14 pH. It will be directly readable to 0.1 and by estimation easily to 0.05. It will be all mains operated.

\* \* \*

THE exhibit of NEGRETTI & ZAMBRA, LTD., comprised a range of its industrial, meteorological, and aeronautical instruments, including temperature control apparatus, pyrometers, hygrometers, level indicators, etc.

### Protective Clothing

A SPECIALLY supple PVC glove for laboratory work made on an interlock fabric base, affording greater sensitivity in use in precision works, is among the new developments shown by JAMES NORTH & SONS, LTD., at the Earls Court section in London. A complete range of industrial protective clothing is on view.

## VITREOUS ENAMEL FAILURE

### Source of Defects in Chemical Plant

Some of the defects of vitreous enamel used as lining of chemical plant were reviewed at a recent meeting in Manchester of the N.W. branch of the Institution of Chemical Engineers in the course of a paper by G. E. Charlsh and E. J. Heeley.\*

The facts were presented from the critical viewpoint of the user, but it was acknowledged that current methods of experimental stress analysis should put in the hands of designers of vitreous enamelled plants means of producing more reliable plant than was possible when the design of such items was evolved empirically.

Mr. Heeley, who read the paper, said vitreous enamelled plant is unreliable, it may fail under mild conditions and withstand onerous ones. Enamel coatings have a characteristic bubble structure (illustrated by photomicrographs of cross-sections of typical commercial and experimental enamels). The small bubbles have no serious effect on the protection given, provided no path exists by which corrosive liquids can reach the metal.

The unreliability of enamelled plant was attributed to defects in the enamel layer. The defects are large voids revealed by a high frequency spark test, caused by loss of enamel by chipping or flaking and, occasionally, inadequate resistance to acids. Defects caused by mechanical damage are craze cracks and fractures in the enamel due to overstrain of the basis metal. Large voids are the most common defect; they can be caused by impurities in the frit, not (in the authors' opinion) by gas occluded by the metal.

Enamels for chemical plant differ in composition from those for domestic ware. High localised stresses in the basis metal must be avoided because they may cause the enamel to fracture and flake off.

## U.S. Hydrazine Production

LARGE-SCALE production of hydrazine in the near future is expected to be accomplished by the Mathieson Chemical Corporation, which is now seeking process improvements to lower the cost and increase output. The company is producing hydrazine in semi-commercial quantities for the U.S. armed forces and the chemical industry, using its own basic chemicals, ammonia, chlorine and caustic soda. In the post-war years interest in the use of hydrazine hydrate as a fuel has increased.

## IRONFOUNDING PROGRESS

### New Laboratories at Blantyre

PROGRESS in technique and output in iron founding, one of Scotland's oldest major industries, was emphasised by Lord Bilsland, speaking at a luncheon in Glasgow last week after he had opened the new laboratories of the British Cast Iron Research Association at Blantyre Industrial Estate.

In a scientific age, declared Lord Bilsland, Scotland had to be aware of the fundamental work of the scientist in opening up opportunities of trade and progress. He considered the new laboratories would perform an invaluable service in proving the technical efficiency of the products of the industry and in dealing with problems of materials, processes, and production. The whole industry was fortunate in having an efficient and active research association.

The industry had passed from the era of craft to technical control, in which the skill of the moulder or coremaker was being reinforced by the knowledge of the metallurgist.

Mr. P. H. Wilson, president of the association, said that the foundry industry was moving towards higher technical control. Shortage of metallurgists and technicians and high expenditure on equipment made a strong case for the consideration of regional laboratories, and he hoped Scottish iron founders would make full use of the facilities at Blantyre.

## Polish Data on Cathodic Protection

AN article by St. Mine and L. Stolarczyk in *Przemysł Chemiczny* (2), 3, on the cathodic protection of ship steel sheet gives data on the potential of steel plates when dipped in sodium chloride solution (3.5 per cent NaCl + 0.1 per cent H<sub>2</sub>O) and cathodically protected from corrosion by zinc and aluminium alloys. Plates protected by alloys containing 30-40 per cent aluminium and 60-70 per cent zinc show the lowest potential.

The potential is a measure of protective current and is therefore indicative of the degree of cathodic protection. The second part of the article deals with measurements of the potential of steel plates dipped in the same solution and coated with varnish and red lead as pigment. Plates coated with films containing the smallest amount of PbO showed the highest potential.

## NEW CENTRE OF MEDICAL RESEARCH

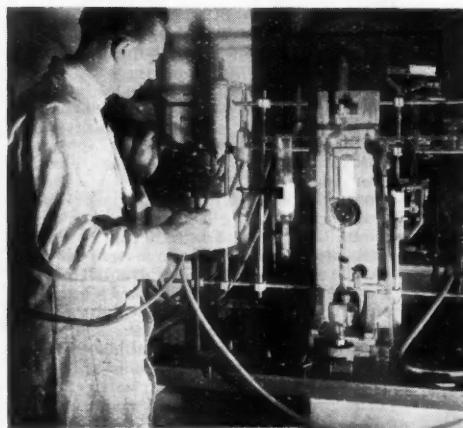
### Larger Rôle of Chemistry in Medical Science

THE great growth of the scope and importance of the several departments of chemistry in contemporary medicine is exemplified more abundantly than ever before in the form of the new headquarters at Ridgeway, Mill Hill, of the National Institute of Medical Research. The new building and the whole establishment bears witness also to another comparatively new aspect of scientific endeavour to which attention was drawn by H.M. the

King, responding to an address of welcome before he and the Queen toured all the departments on May 5. "The work of the institute," he said, "exemplifies that spirit which inspires the State and science to work together for the health and happiness of mankind . . . without distinction of race, colour or creed."

The theme of chemistry is given full scope by the devotion to it of much of the

(continued on page 752)



Above: Dr. G. J. Popjak sets up a vacuum distillation apparatus for fractionating fatty acids in the biochemistry laboratories, where radioactive isotope techniques are being used. Above, right: Indicative of some of the advanced examples of centrifuge design is this large-scale apparatus in the biophysics department. Right: Part of the ample and well-designed library, having a gallery for easier access to some of the 20,000 scientific works it contains

## Fuller Scope for Coal Tar Research

### New Laboratories at Gomersal

A FURTHER step to supply the need for research to widen the range and scope of the products from coal tar was taken last week, when Sir John Anderson opened the new laboratories of the Coal Tar Research Association at Gomersal, near Leeds.

The premises, formerly the Union Mills, were leased from the Ministry of Supply. A survey was made by the director, Dr. D. McNeil in consultation with Mr. J. Steadman, civil engineer of the Midland Tar Distillers, Ltd. Contractors moved in early in 1949, the office accommodation was ready by June and immediately occupied.

The first laboratory was ready by September, and research on a small scale was begun. By Christmas the research station had been completed and a staff of 55 recruited, including 16 graduate chemists and 18 assistants.

Conversion of the old buildings to laboratories posed problems which are not met with in designing and building on a vacant site. In addition, the Coal Tar Research Association was a new venture without existing apparatus or plant and without research background which would enable "tailor-made" laboratories to be designed.

The premises consist of a large single storey building having a total floor area of 24,500 sq. ft. and a two-storey brick building containing 7000 sq. ft. floor area.

#### NEW CENTRE OF MEDICAL RESEARCH

(continued from previous page)

north-east and north-west wings, the latter being given over almost entirely to chemotherapy, the expansion of which was one of the objectives influencing the removal from the relatively cramped quarters the institute had occupied at Hampstead for some 30 years. Sharing the same wing, on the ground floor are the organic chemistry laboratories (Dr. J. Walker), notably concerned now with anti-tubercular drugs and the identification of plant substances from which cortisone may be produced.

The biochemistry department (Dr. A. Neuberger) has been favoured with the whole of the ground floor and part of the first floor of the north-east wing, in which the elaborate existing equipment concerned largely with advancing knowledge of the thyroid, amino-acid metabolism and porphyrin, is soon to be supplemented by a radiochemical laboratory. The synthesis

In the latter the upper floor has been divided into offices, library, a conference room and dining room. Part of the lower storey houses the stores and the glass blowers' workshops.

Laboratories are all situated in the area between the south wall of the main building and the furthest dividing wall, which has been extended by a partition. This has been divided by glazed partitions into six main and two smaller laboratories, a balance room, an autoclave block house and offices for four section leaders.

Space has been provided for semi-technical plant where need arises, and there is a fully-equipped workshop in another part of the building.

The analytical, organic, and general laboratories have supplies of water, gas and electric power and a centre low shelf for reagent bottles. In the physical laboratories there are heavier electric power supplies.

Fume cupboards are of two types: open-fronted for handling irritant but non-toxic vapours and sash-fronted for complete protection against poisonous materials.

In the still room is housed a battery of six automatic stills of efficiencies ranging from 25 to 80 theoretical plates. No benches are provided in the catalytic laboratory. Stout wooden tables are provided, around which the various units can be built.

of compounds to make use of radioactive isotopes is one of the objectives.

Other chemistry departments sharing the north-east wing are the bacterial chemistry division (Dr. M. R. Pollock) and the division of physical chemistry (Dr. W. J. Elford).

The common characteristics of all departments is the great advance in the standard of equipment and of modern laboratory fitting and the closer collaboration between all sections of research, an established policy which the present layout is well designed to advance. Typical of the very advanced standard of equipment is the provision in the division of biophysics of two electron microscopes, electrophoresis apparatus, a mass spectrometer for stable isotopes, new types of centrifuges and freezedryers and ultrasonic machines. This supplements an ample range of more traditional scientific equipment and much of it finds counterparts in other departments.

## A POSSIBLE RIVAL OF PYRETHRUM

### Some Economic and Chemical Merits of Allethrin

From A CORRESPONDENT

THE employment of pyrethrum as a natural and powerful insecticide has been established for more than a century. The extract from tropical flowers of the chrysanthemum species, it has been increasingly used in modern times as the basis of domestic sprays and insect powders. It has also been used, to a rather less extent, in the control of horticultural crop pests.

Its widest use is in the United States, where 20 million lb. of crude pyrethrum is annually imported in normal times. The crude natural product has, therefore, exceptional economic significance since it is one of the few materials which the U.S.A. does not produce substantially and thus represents an important sterling area export to America.

#### Increasing Demand

In 1937 Japan was the principal supplier, providing nearly 18 million lb. of America's total imports of 20 million lb. In that year, Kenya's contribution amounted only to rather less than 1.5 million lb. Steady expansion has enabled Kenya to supply the major part of America's needs—in 1945 Kenya provided 12.5 million lb. out of a total import of 18 million lb. U.S. scientists visited Kenya after the war on a mission to encourage the further expansion of pyrethrum production. Despite the use of DDT and other new synthetic insecticides, the demand for pyrethrum has consistently exceeded supply, and in the last two years the price of crude pyrethrum has risen by about 25 per cent.

As a domestic insecticide, pyrethrum has two widely recognised advantages. It has a much more rapid "knock-down" action than DDT. Its second merit is its very low toxicity to humans and animals.

Its prospects of extended use in agriculture have probably been improved as a result of the introduction of DDT. The latter has shown how great are the benefits livestock pest control offers in milk and meat production, while the knowledge that DDT may act as a cumulative poison which tends to build up in animal fats has led to its virtual exclusion from dairy farming in America, the Food and Drugs Administration having refused to permit any tolerance for DDT content in dairy products.

The gap that has been left could be filled, at least partially, by pyrethrum.

Even in the domestic insecticide field, DDT has increased rather than reduced the opportunities for pyrethrum. Manufacturers of household fly sprays based upon DDT found it desirable to combine pyrethrum with DDT to procure rapid knock-down action as well as residual effect. Recent evidence that surviving flies breed DDT-resistant generations has further enhanced the claims of pyrethrum.

#### Synthetic Competitor

In the spring of 1949, it was announced by the U.S. Department of Agriculture that pyrethrum had been "synthesised" in laboratory-scale experiments. It was a limited synthesis, because the new synthetic material was actually a homologue of one of the active ingredients of natural pyrethrum. At this stage it was generally considered that commercial development would require several years of further research. In 12 months, however, fairly large-scale production has been achieved by one American manufacturer (the Union Carbide and Carbon Corporation). In March, 1950, tonnage production and distribution was announced.

It is not claimed that the synthetic material is as effective as natural pyrethrum, but it appears to possess closely comparable properties. Such a synthetic near-substitute is certain to be a serious competitor of the natural product of Kenya.

#### Production Difficulties

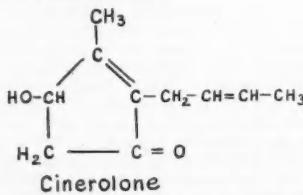
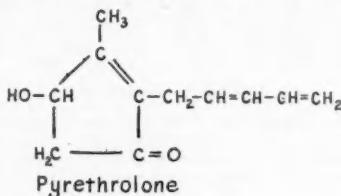
Pyrethrum can be successfully cropped only in high altitude tropical climates and a large amount of hand labour is required in harvesting and production of the crude material; these factors prevent natural production at low cost and in unlimited quantities. Moreover, it takes some years to expand pyrethrum production, as is generally the case with materials whose supply depends upon farm cropping.

The chemical synthesis is far from simple. Until quite recently, the insecticidal properties of crude pyrethrum were believed to depend upon two ingredients, complex esters known as pyrethrin I and pyrethrin II. The chemical constitution of the pyrethrins was revealed in 1924; they are respectively esters of chrysanthemum mono-

carboxylic acid and the similar dicarboxylic acid with the cyclopentenolone known as pyrethrolone.

Most of the further structural research on the pyrethrin esters was aimed at determining the precise arrangement of the pyrethrolone part of their molecules. In the course of it, two further insecticidal ingredients in pyrethrum were recently isolated; these were again closely related to one another and to the pyrethrins, and were named cinerin I and cinerin II. They were the similar esters of cinerolone.

The structural formulae of pyrethrolone and cinerolone are these:

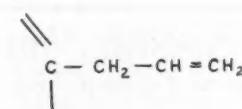


British research in 1945 had established a synthesis for chrysanthemum monocarboxylic acid. American research began in early 1948 and succeeded before the end of that year in synthesising a stereo-isomer of cinerolone.

When this isomer was esterified with synthesised chrysanthemum monocarboxylic acid, a material as powerfully toxic as the natural cinerin I was produced. Furthermore, homologues of this synthetic substance have been produced by modifying the side-chain attached to the pentose ring of cinerolone, and some of these homologous esters proved to be more toxic to insects.

One of these, the allyl homologue, was claimed to be more toxic in some conditions than the combined active principles of natural pyrethrum. It is this allyl homologue which has achieved fairly large-scale commercial production this spring. It has been given the official and more convenient name of allethrin.

According to early accounts from the U.S.A., the synthesis requires 12 stages and 11 intermediates must be processed. Alto-



### Synthetic allyl homologue of cinerin 1

gether 200 lb. of material have to be handled to yield 1 lb. of allethrin. Although this points to costly production, it must be weighed against a comparable defect of the natural method: pyrethrum flowers have an average content of 1.2 per cent of these toxic esters; about 7000 tons of flowers flown to the United States from Kenya in the war produced only 80 tons of active pyrethrum insecticide.

During the wartime uncertainty of pyrethrum supply it was found that its insecticidal properties could be "stretched" by incorporating synergists, particularly piperonyl butoxide. It has already been established that the synthetic allethrin is equally responsive to this help from synergists.

### Price Problems

Allethrin has knockdown toxic properties similar to those of pyrethrum. It is said to have a superior residual effect; this will be an advantage in domestic and sanitary uses but possibly a disadvantage in crop protection. Like the natural insecticide, it can be mixed with DDT.

The price of allethrin is said to be 10-15 per cent less than that of the natural material. If the usual course of economics associated with synthesis production is followed this price may be expected to fall steadily as output increases and processing is improved. Post-war discussions between Kenya and the U.S. have only failed to arrest a steady rise of the price of crude pyrethrum which, according to growers, is unavoidable if this crop is to be expanded in preference to others. There is, however, one means by which the price of the natural product could be sharply reduced without making its cropping uneconomic—by extracting the crude flowers in Africa and thus reducing the disproportionately high transport costs incurred in exporting 100 tons which yield only about 1.2 tons of concentrated insecticide in the importer's factories. It remains to be seen whether Kenya can give this answer to a sudden synthetic challenge.

### SOURCES

- E. R. de Ong, "Chemistry and Uses of Insecticides," 1948.
- R. O. Whyte, "Farming for Industry," 1948.
- Schecter, Green and LaForge, *J. Am. Chem. Soc.*, 71, 1517, 1949.
- Idem*, *Agric. Chemicals*, 4, 6, 57, 1949.
- Editorial, *Chem. Industries*, 66, 5, 506, 1950.

T  
a  
organ  
comm  
readi  
and  
Th  
mon  
flash  
index  
The  
0.940

Lik  
respo  
cesse  
much  
a-me  
satur  
being  
satio

Ca  
styre  
cata  
cent  
certa  
blea  
obta  
dim  
70-9  
satu  
tratu

W  
poly  
ated  
is p  
cats  
con  
poly

H  
pro  
extr  
cate  
Res  
cal  
tem  
from  
mol  
slow  
Bel  
ten

## U.S. ADDITION TO PLASTICS SOURCES

### Useful Attributes of Alpha-Methyl Styrene

From A CORRESPONDENT

THE unsaturated pure hydrocarbon,  $\alpha$ -methyl styrene, has been known to organic chemists for many years, but only recently has it been manufactured on a commercial scale (in the U.S.A.) from readily available raw materials—propylene and benzene.

The boiling point of  $\alpha$ -methyl styrene monomer is 165.88° C. (760 mm. mercury); flash point 186° F.; fire point 186° F. and index of refraction at 25° C. is 1.53586. The viscosity in centipoises at 20° C. is 0.940.

Like styrene, the  $\alpha$ -methyl styrene responds to the usual polymerisation processes, but not so readily, exhibiting little tendency to polymerise at temperatures much below 250° C. The polymers of  $\alpha$ -methyl styrene exist in both the unsaturated and saturated forms, the latter being produced from the former by cyclisation.

#### Controlled Polymerisation

Catalytic polymerisation of  $\alpha$ -methyl styrene can be carried out by using several catalysts, the most important being concentrated sulphuric acid, stannic chloride, certain solid catalysts such as metallic powders, boron trifluoride, activated bleaching earths, etc. It is possible to obtain mixed saturated and unsaturated dimers, trimers and tetramers by using 70-90 per cent aqueous sulphuric acid and saturated dimer by employing concentrated sulphuric acid.

With stannic chloride a very vigorous polymerisation takes place to form saturated low molecular weight polymers. It is possible, therefore, by careful choice of catalyst and regulation of polymerisation conditions to prepare almost any type of polymer.

High molecular weight polymers can be produced by solution polymerisation at extremely low temperatures using ionic catalysts. Work carried out by the Research Department of the Dow Chemical Company has shown that as the temperature of polymerisation decreases from 20° C. to -100° C., the average molecular weight of the polymer increases, slowly but linearly, from 20,000 to 30,000. Below -100° C. the molecular weight tends to rise very abruptly, reaching values as high as 84,000 at -130° C.

High polymers made from  $\alpha$ -methyl styrene can be moulded into clean transparent articles possessing good strength and subject to a melting point of 200° C.—higher than that of polystyrene. Although the impact strength of the new polymer is somewhat inferior to that of polystyrene the polymer possesses certain important advantages, e.g., it is resistant to distortion in boiling water and unaffected by petrol.

#### Co-polymers

Of considerable interest is the preparation of co-polymers from  $\alpha$ -methyl styrene, e.g., with vinyl methyl ketone (U.S. Patent 1,937,063), with vinylidene chloride (U.S. Patent 2,160,932), with butadiene (U.S. Patent 1,938,730) and with styrene (U.S. Patent 2,401,266).

In synthetic rubber manufacture the partial substitution of  $\alpha$ -methyl styrene for styrene in a GR-S formula, using 25 parts of styrene to 75 parts butadiene, produces a somewhat inferior rubber, but a copolymer containing 80 parts butadiene and 20 parts of  $\alpha$ -methyl styrene appears to be superior to most butadiene-styrene rubbers.

Of considerable importance is the fact that low-weight polymers of  $\alpha$ -methyl styrene are finding growing uses as plasticisers for various resins, colourless viscous liquids possessing wide compatibility and ready solubility.

Paint manufacturers are showing some interest in styrenated oil compositions made by reacting the monomers with drying oils or oleo resinous compositions. Here the  $\alpha$ -methyl styrene is generally employed in conjunction with styrene, the recommended mixture being 65-75 per cent styrene and 25-35 per cent  $\alpha$ -methyl styrene.

#### Australian Plastics

Recent developments in the Australian plastics industry include production of PVC polymer at the plant of Imperial Chemical Industries of Australia and New Zealand, Ltd., at Botany, N.S.W., and the establishment of a new urea plant at Deer Park, Victoria, by the same company. The new factories are claimed to be among the most modern of their kind in the Southern Hemisphere.

## THE CHEMIST'S BOOKSHELF

**ANTIMON UND SEINE VERHÜTTUNG.** By Dipl.-Ing. Walter Wendt, 1950. Franz Deuticke Verlag, Vienna. Pp. 104. \$2.

THIS is a book by an expert who spent his career on the metallurgy of antimony and modernised the Slovak smelting plant at Vajsková, one of the most important plants in Europe. The book is well illustrated with 30 photographs, drawings and sketches and contains 23 instructive tables. It presents a comprehensive international bibliography.

Discussing the comparatively modern metallurgy of antimony, it reviews in an historical introduction the development of plants in Slovakia, Jugoslavia, Germany and China. Starting with the raw materials and their enrichment by flotation, as practised in Europe and the U.S.A., particularly as a means of upgrading stibnite, the book describes in detail the blast furnace process and reviews the production of the raw regulus, its refining and the utilisation of the slags (de-arsenisation).

This process as a means of putting arsenic minerals into the tailing has simplified antimony smelting, so that the de-arsenification of ores or metal is now much easier. The possibilities of extracting lead and rare metals, particularly gold, are the subject of special chapters. The blast furnace smelting as well as the refining process, the electrolysis, the condensation and some new patented methods are well described.

The following chapters deal with the properties, uses, and analysis of antimony. Refining of the metal and starting of the final product are emphasised. This custom of marking the cakes of metal with the characteristic stars on their proper surface is mistakenly taken as a guarantee of purity. The de-leading of antimony is a section of interest to processors of antimonial scrap lead.

A report of the U.S. Bureau of Mines dealing with this volume has urged that it would be a distinct service for someone to translate the book into English.

### Dyeing and Finishing Charges

The Spun Rayon Fabric Dyers Group has issued a new price list for dyeing, finishing, desizing and making-up of 100 per cent spun rayon fabrics and mixtures of spun rayon with other fibres, to dyers, converters, and others. The basic rates are practically the same as last year's, which are now withdrawn.

## INEXHAUSTIBLE NITROGEN

THE importance of the nitrogen cycle in nature, which ensures that, unlike other natural resources generally, our vast reserves of atmospheric nitrogen are never likely to become exhausted, was discussed by Section B (chemistry) at the annual meeting of the British Association, held last year at Newcastle. A summary of the discussion which was introduced by Professor G. R. Clemo is given in *The Advancement of Science* (Vol. VII, No. 25) the association's quarterly publication.

Among the many groups of naturally occurring nitrogenous substances, the professor made special mention of chloromyctein, the first organic nitro compound to be discovered in nature and containing the fundamental C<sub>6</sub> unit characteristic of many plant products.

Various ways in which chemistry can assist agriculture were also discussed and a report, edited by Dr. G. I. Higson, under the title of "Chemistry and the Food Supply" is also reproduced, giving the main points from five papers.

Other interesting papers reproduced in this issue include "Modern Theories of the Origin of the Universe," by Professor Herbert Dingle; "Algae and Calcareous Rocks," by Professor F. E. Fritch; and "Biological Aspects of River Pollution," by Dr. B. A. Southgate.

## The History of Chemistry

CHEMISTS concerned with the historic development of their subject and students in their third year and above will appreciate a course of six lectures and demonstrations to be given in June and July at East Ham Technical College, Barking Road, E.6. The series entitled "The History of Chemistry" will be given by H. H. Neville on Monday evenings from 6.30 to 9 o'clock.

The origins of modern chemistry will be the initial subject on June 5, followed by: the atomic theory—early electrochemical ideas (June 12); early ideas on molecular structure of organic compounds (June 19); the development of structural theory and of synthetic chemistry (June 26); inorganic and industrial chemistry in the 19th century (July 3); and the development of physical chemistry (July 10).

### Pensions Scheme Extended

A pensions scheme for widows and orphans has been adopted by the Dunlop organisation. Widows will receive pensions up to £260 a year.

## Technical Publications

A VERY wide range of laboratory supplies, examples of which are now being shown in the company's BIF exhibits (C61, Olympia) is described and illustrated in a series of folders newly issued by W. & J. George & Becker, Ltd. These supplement the literature on modern balances and describe and illustrate the phenolic plastic filter pump, a range of burners, precision magnetometer, the D'Arsonval galvanometer, optical demonstration apparatus and resistance boxes.



[Courtesy of Quasi-Arc Co., Ltd.

Electrode holder, type EH. 50, for welding at currents up to 50 amps. Weight  $5\frac{1}{4}$  oz.

SOME of the ways in which the atomic pile is serving scientific investigation are discussed by Sir John Cockcroft in the April issue of *Endeavour*, the quarterly scientific review, published by I.C.I., Ltd. The chemical constitution of amber—a mixture of various resinous substances approximating to  $C_{10}H_{16}O$ , which also contains small amounts of inorganic compounds such as the chlorides and sulphates of calcium and magnesium—is described in an article by G. Kirchner, which is illustrated by colour plates.

AMONG the many useful services of the Department of Scientific and Industrial Research is the periodical publication by the Overseas Liaison Division of lists of forthcoming international scientific and technical conferences held in Great Britain or overseas, of interest to research laboratories (Government, industrial or academic), and to individual scientists. List No. 7 (March, 1950) is now available and covers the current year and some principal dates in 1951 and 1952. Exhibitions of particular scientific interest are included.

TIMBER, wool and cereals are subjects of the three new booklets now available in the Raw Material Survey series being published by the Purchasing Officers' Association. A total of 17 titles is planned, including non-ferrous metals, oils and fats, natural and synthetic fibres, chemicals and fertilisers.

THE development of cellulose derivatives has been one of the main objectives of Courtaulds, Ltd., since 1905. The firm's wide experience in cellulose acetate materials has been neatly summarised in a booklet, "Cellulose Acetate Plastics," just published, which covers all stages from the raw material to the finished products.

NEW electrode holders for manipulation of the light gauge electrodes used in sheet metal welding have been designed by the Quasi-Arc Co., Ltd., Bilston, Staffordshire. The design embodies a spring loaded plunger which wedges the electrode in the brass barrel of the holder and can be easily released by a trigger. Electrodes may be gripped in either of two positions, making the holder satisfactory for positional as well as downhand welding. The smaller type EH.50 weighs  $5\frac{1}{4}$  oz. and is designed for welding with 16 or 14 s.w.g. electrodes at currents up to 50 amperes. The larger type EH.150 weighs  $12\frac{3}{4}$  oz and is for use with 16 to 10 s.w.g. electrodes at welding currents up to 150 amperes.

A REFINEMENT in present automatic process control apparatus is the multi-functional valve positioner described by Negretti and Zambra, Ltd., in its latest catalogue (R/29). The unit can be readily mounted on all sizes and types of diaphragm valves and level motors. It can be adapted to valves which close with air failure or open with air failure and is suitable for control line pressures of 15, 20 or 25 p.s.i. (output pressures up to 40 p.s.i.).

THE latest developments by some 124 German chemical engineering firms and a series of articles by leaders of science and technology form the first part of the "Achema Year Book," 1940/50. The volume of 704 pages is edited by Herbert Bretschneider on behalf of the Dechema, Deutsche Gesellschaft für Chemisches Apparatewesen E.V., and has many illustrations. The directory of manufacturers of laboratory equipment and works plant contains about 19,000 entries. The first part of the work is devoted to the discussions planned to take place at the Achema IX Exhibition (Frankfurt, July 9-16).

## Accuracy of the Chemical Balance

### In Advance of Most Laboratory Measurements

THE extent to which the chemical balance has outstripped most other measuring devices of the laboratory produces some anomalies in analytical and other techniques and represents incidentally a challenge to procure further refinements in other equipment. In most physical measurements in the laboratory an accuracy of  $\pm 0.05$  per cent is considered precise: in weighing 200 gm. some balances provide an accuracy of 0.00005 per cent (0.1 mg.).

#### High Accuracy

These facts are recalled in "The Nivoc Supplement" (W. & J. George & Becker, Ltd.) which calls attention to the fact that the great precision possible with the balance is often employed unnecessarily in physical determinations where other measurements cannot be made so accurately; but in chemical determinations, where small differences of weight have often to be measured, this high accuracy is essential.

The article, which emphasises how important is correct use to take advantage of the great precision now possible, also provides a useful basic summary of the theory and construction contributing to the high efficiency of balances.

It observes that the mathematical theory of the balance is dealt with fully in many textbooks. The main conclusion to be drawn is that a sensitive, consistently accurate and practical balance should have a light but strong beam, pointer and pan system; hard, sharp and non-corroding knife-edges arranged to lie exactly in one plane at all loadings of the balance; and suitable arrangements for protecting the sensitive parts of the balance when they are not in use.

#### Permissible Error

The accuracy of the balance when used in the normal single weighing method depends entirely on the two arms of the balance beam being exactly equal, i.e., the distance from each outer knife-edge to the centre knife-edge must be identical. In the 200 gm. balances accurate to 0.1 mg., the maximum permissible error is one two-millionth of the length of the balance arm, a dimension which amounts to little more than one-millionth of an inch, or about one two-thousandth part of the thickness of a hair.

Further, the three knife-edges must be parallel to an equal degree, or the apparent weight of an object will be affected by the position in which it is placed on the balance pan. The consistency of the balance from weighing to weighing, and during its life, is highly important and depends upon choice of suitable material for the knife-edges and planes, which should be sharp and straight, and optically flat respectively.

The material from which the knife-edges and planes are made is a special hard grade agate. For some purposes steel is satisfactory, although rust is a constant menace, while synthetic sapphire (or corundum) is also used to a smaller extent. The knife-edges and planes need careful protection, and various types of "arrestment" are used to remove them from stress when weighing is not being performed.

This article considers that the best type is the "fall-away arrestment," in which supports are gradually withdrawn from the beam and pans until the knife-edges and planes are in contact.

#### Lightness of Beam

The sensitivity of the balance is determined entirely by the lightness of the beam and pointer system; by the distance the centre of gravity of this system lies below the central knife-edge; and by the length of the arm of the balance. Practical considerations limit the use of the latter two variables, and therefore it becomes essential to use a very light construction for the beam of a sensitive balance. Careful design is required to obtain a beam which does not deflect appreciably when fully loaded and which has its centre of gravity correctly located.

The period of swing is an important practical consideration, for a very sensitive balance may have all its other advantages offset by the inconvenience and tedium of having to wait 30 seconds or more for each observation of the pointer position. Other things being equal, a light balance beam is required for a short period, and this is another reason for the use of light materials and the method of construction of sensitive balance beams. Further, it is the reason for the use of short beam balances, since theoretically a long beam balance should give greater sensitivity.

## OVERSEAS CHEMISTRY AND INDUSTRY

## GERMAN EXPORT PROSPECTS

## Plans to Recover Pre-War Status

A CRITICAL review of world chemical trade and of Germany's position therein is offered in the April issue of *Chemische Industrie* (pp. 151-168). It is recalled that, before the war, about 60 per cent of German export trade was carried on through overseas "partner" agreements. The present rather one-sided liberalism is criticised, on the grounds that Germany gives much in the way of lowered tariffs and receives little in return. The high import tariffs of the U.S.A. are particularised as a serious hindrance.

These German views emphasise that European export trade urgently needs a broader and freer entry into the markets of the American continent, Africa, and south-east Asia. Even countries supporting liberalism in trade are considered to have done so more in principle than in fact. While Germany has reduced or completely removed import duties from 44-60 per cent of her imports, many other countries have given relief only to the extent of about 25 per cent.

Concluding the review in which these factors are distinguished, W. E. Menne, president of the Arbeitsgem. Chem. Industrie, expresses some satisfaction that Germany's efforts to expand her export trade in recent months, especially in quality products, have met with some success.

In an article on West German chemical exports in 1949, Dr. K. Schneider observes that out of a total of about Dm.350 million (\$95 million) 80 per cent went to Europe, 9 to America, 8.4 to Asia, 1.5 to Africa, and 1.1 per cent to Australia. Some details are given of the individual groups of exports, in which fertilisers took second place, valued at Dm. 14.2 million.

## Exchange Reserves

The special problems of the wholesale and export trades in the chemical field are discussed by Hellmuth Carroux, president of the Verband des deutschen Chemikalien, etc. Important among these is the provision of imported raw materials by building up exchange reserves, some examples of which are the oils, fats and soap industries and the paint and varnish trades.

A thorough study of world markets is needed and the renewal of former contacts in various countries, a task which is

claimed to be rather difficult because of restrictions and travel costs. A specialised organisation should examine, for a particular chemical group, foreign developments, market tendencies, and production conditions much more intimately than could an individual manufacturer.

The author makes particular reference to the needs of the pharmaceutical branch, with which he is closely connected, which constitutes one of the most important sections of his association. The necessary raw materials, mainly of plant origin, are spread over the world, and a profound knowledge of sources of supply, prices, quality, etc., could best be acquired by a trade and technical association. A further task is that of facilitating close collaboration at home and abroad between producers of raw materials and manufacturers of finished and semi-finished goods.

## Sequestration

The Trade Mark Association (Markenverband e.V.) in Wiesbaden has recently presented a report to the West German government expressing the view that it is being recognised abroad that the sequestration and other restrictive steps taken against German trade mark rights have not always been in the best interests of the general public.

Dr. Erich Herzog refers to the part played by heavy chemicals in export trade and notes the inroads made in former German markets by the development abroad of domestic chemical industries. The productive capacity for heavy chemicals has been increased enormously in the U.S.A., England and France, and in a proportionate degree in other smaller countries. The high cost of imported raw materials, loss of patent and trade mark rights and other difficulties have weighed heavily. Despite these, however, exports of inorganic chemicals have made good progress, in particular, sulphuric acid, alkalis, sodium sulphate, aluminium fluoride, chromates and bichromates. Exports of potash, which had almost ceased in 1949, were recently resumed.

It is concluded, however, that there is an urgent need to increase substantially the range of chemical exports, if a favourable trade balance is to be restored.

## Increasing Mineral Yields in Egypt

### Recommendations for an Iron and Steel Industry

**E**GYPTIAN Government advisers have stated that reserves of iron ore in their country amount to at least 300 million tons, containing 45-50 per cent of iron oxide.

This information is reported by C. E. Butterworth, Assistant Canadian Government Trade Commissioner, in an article published in *Foreign Trade* (7, No. 173, 694-7).

H. A. Brassert & Company, the American consulting engineers, is said to have made a wide survey in Egypt and reported that the Egyptian market justifies the establishment of an iron and steel industry and can keep it in regular operation; the quality of the ore is excellent, easily reducible, and can be mined at low cost. Whether the works are at Aswan, using electrical smelting with a reduced amount of imported coke, or in Cairo, employing blast furnace smelting, the industry would give an adequate profit.

Some Government officials have proposed the exploitation of iron ore deposits along the Red Sea coast and that the ore should be transported to Suez, where a proposed plant could make use of local oil for smelting. This group maintains that the project at Aswan (some 800 miles from the Nile Delta) could be developed only to satisfy local needs, whereas a plant at Suez might compete in the world export market for steel.

Egypt has a variety of other mineral resources and, although increased interest in prospecting and mining is evident, the capital and organisation of enterprises is

still supplied mainly by foreign sources. Discoveries in the past 15 years have led to the opening up of new areas and the growth of the industry is manifested in the steadily increasing revenue of the Department of Mines and Quarries, which recently reached £E.942,692 in a year, an increase of £E.878,963 above the 1938 revenue.

Additional reserves have been proven of phosphates, manganese, gold, iron ores, talc, chromite, graphite, tungsten and kaolin. In the metals group there are deposits of lead, zinc, molybdenum, copper, nickel, titanium, beryllium and thorium.

Deposits have also been established of limestone, marble, gypsum and anhydrites, building sand and clays, fuller's earth, asbestos, zircon, bentonite, barium and strontium.

The most important exports are phosphates, iron ore, manganese, talc and petroleum. Phosphate deposits are abundant and of good quality. Because of the high level of duties levied by the Suez Canal authorities, Egyptian phosphates have been unable to compete in the dollar markets; the Government of Egypt has been asked to subsidise the industry to make this possible. The commodity's best markets are stated to be Australia, New Zealand, South Africa, Ceylon and Japan.

Oil is, of course, Egypt's most valuable mineral deposit. Production of oil in 1948 was 1,890,595 metric tons. If the domestic demand of 46,000 barrels per day does not greatly increase, the country is believed to be in sight of self-sufficiency.

### Mechanical Seals Agreement

**FLEXIBOX**, Ltd., manufacturers of mechanical seals, and **Vokes (Canada), Ltd.**, a new subsidiary of **Vokes, Ltd.**, the filtration specialists, have recently concluded an agreement for the sale and servicing of Flexibox mechanical seals in Canada. **Vokes (Canada), Ltd.**, will act as agents for the entire range of Flexibox mechanical seals, which now embrace the following uses: oil refinery and chemical plant process pumps, refrigeration compressors, pumps handling food and pumps handling corrosive fluids such as some acids and alkalis.

**Vokes (Canada), Ltd.**, is exhibiting at the Canadian International Trade Fair from May 29 to June 9 at Toronto, and Flexibox, Ltd., has taken part of the space for the display of its seals.

### Standardised Electric Motors

**CROMPTON PARKINSON, LTD.**, announces the development of a new range of a.c. motors, initially between 1 and 20 h.p., based on American and Canadian standards.

American and Canadian manufacturers have for some years had common standard frame sizes to make their motors interchangeable. The new Crompton Parkinson range will have standard American frames, but will be available with alternative horse-power ratings—one design for those markets requiring American standard dimensions and ratings, and another of identical dimensions but with greater horse-power for the British market.

This interchangeability will enable British manufacturers to meet the requirements of home and overseas markets.

## SOUTH AFRICA'S MATERIAL SOURCES

### Continued Expansion of Home Production

From Our CAPE TOWN CORRESPONDENT

THE chairman of the Industrial Development Corporation is heading a mission to the U.S.A. in connection with the scheme to make oil from coal. The mission's aims are mainly technical, but it is generally expected that American opinion will be sounded about the possibility of American financial participation in the organisation which is to be set up under the licence granted last year to the Anglo-Transvaal Consolidated Investment Corporation. It is possible that credits for the supply of plant may be arranged, rather than direct financial assistance to the semi-national company which is to handle the scheme. The original licence terms restricted the authorised capital of the concern to £18 million, but official statements now mention £15-20 million as the amount required to establish the industry. It is estimated that about one-third would be spent in the Union. The first of the coal-to-oil plants will be by the Vaal River in the O.F.S.

\* \* \*

MARINE Oil Refiners of Africa, Ltd., Simonstown, is making an improved marine drying oil for both general and specific purposes, vitamin A concentrates (by the Solexol process), low-potency vitamin A and D feed oils for human and animal consumption, and hardened marine oils. Up to 50 per cent of Maripol has been found suitable as a replacement for raw linseed oil in making putty. The high induction period in the drying of Maripol prevents hardening and skinning in bulk before use, and the durability of putty embodying such oils has been found equal to that of a linseed oil putty.

\* \* \*

NEW products of Permoseal (Pty.), Ltd., Cape Town, are a fluid shellac gasket cement, a general jointing compound, and a water sealing compound. Production has been in progress for a few months and markets have been developed in neighbouring African territories. The local demand is also very much greater, as it is now difficult to obtain supplies of imported compounds. These items are being made to British formulae and are of high quality. The jointing compound has passed a rigorous test from the South African Bureau of Standards, which worked on data supplied from Britain.

IN the current movement to increase the local manufacture of synthetic resins, it is pointed out that the import of raw materials, instead of the higher-priced end-products, could effect a considerable saving in foreign exchange. Part of these raw material needs could be obtained locally. It is believed that nearly all the additional plant and equipment required could be made locally; much of the plant and equipment now in use is South African made. The local synthetic resins are reported to have been well received by the nearby industries. Locally made products are considered preferable to those synthetic resins which polymerise fairly rapidly and cannot, in view of the financial risk, be conveyed by ship over long distances. The industry is concentrating initially on the production of synthetic resins for coating and adhesive purposes, but it is expected that the way will be opened for the later production of thermoplastic materials. There are many potential users and the Board of Trade and Industries has expressed itself in favour of the establishment of a local synthetic resin manufacturing industry which will contribute to the diversification of the Union's economic structure.

\* \* \*

PLASTICS and Allied Industries (Pty.), Ltd., are making vinyl chloride coatings of more than 30 different types, including coatings highly resistant to acids, alcohol, alkalis and other chemicals. They resist abrasion and thermal shock and retain integrity and bond for long periods. These coatings are being made in South Africa under licence from the Bakelite Corporation of the U.S.A.

\* \* \*

ETHYL silicate is now being made in quantity by Silicon Chemicals (Pty.), Ltd., which is an associate of the Rely Paint and Metal Works, Ltd., in a large new factory at Klipfontein. This product is being sold locally for foundry applications and the manufacture of paints and for damp-proofing, water-proofing and the preservation of stone work.

\* \* \*

THE rapidly developing Union Liquid Air Co. (Pty.), Ltd., Johannesburg, plans to increase its capital to £600,000. This company began operations in October 1949.

## PERSONAL

### Next President of the ACS

DR. N. HOWELL FURMAN, Russell Wellman Moore Professor of Chemistry in Princeton University, New Jersey, has been chosen as president-elect of the American Chemical Society. The doctor, a leading analytical chemist, will hold office next year, when the society celebrates its diamond jubilee and when American chemists will be hosts to the 16th conference of the International Union of Chemistry and the 12th International Congress of Pure and Applied Chemistry.

The following officers will serve the industrial Pest Control Association during 1950: President, DR. F. P. COYNE, Imperial Chemical Industries, Ltd.; vice-president, MR. S. W. HEDGCOCK; hon. treasurer, MR. C. STUART KREGOR. The secretary is MR. W. A. WILLIAMS.

DR. W. ALBERT NOYES, JR., chairman of the department of chemistry in Rochester University, New York, has been appointed editor of the *Journal of the American Chemical Society*. He succeeds DR. ARTHUR B. LAMB, of Harvard University, who retired after 31 years' service.

Four new members of the Textile Institute's council are: MR. J. R. HEALEY (chairman of the Yorkshire section); MR. J. C. H. HURD (hon. secretary Midlands section); MR. GEOFFREY LOASBY (chairman, South Wales and Monmouthshire section); and MR. R. G. OVERSBY (hon. secretary, Yorkshire section).

MR. F. G. BEVIN, managing director of Crosfields and Calthrop, Ltd., Liverpool, and a director of other firms, has been elected president of the Liverpool branch, Incorporated Sales Managers' Association. MR. ALBERT BIRD, sales manager of the same company, has been appointed chairman of Liverpool branch ISMA.

DR. PAULINE BERRY MACK, director of the Ellen H. Richards Institute and professor of household chemistry at Pennsylvania State College, has been chosen to receive the 1950 Francis P. Garvan Medal for women in chemistry. The award will be made at the 117th national spring meeting of the American Chemical Society.

MR. WILLIAM FLOCKTON, of Sheffield, steel manufacturer, left £48,120.

SIR JOHN ARTHUR ALTON, C.B.E., of Duffield, Derbyshire, late governing director of Alton and Co., Ltd., pipework specialists and ironfounders, left £88,157.

## EXPLOSION UNEXPLAINED

### Inquiry into I.C.I. Fatalities

THE cause of the explosion at the Ardeer (Ayrshire) factory of I.C.I., Ltd., on April 4, which resulted in the death of four women workers, remains unexplained. At a public inquiry in the Kilmarnock Sheriff Court last week, James Campbell Hornel, deputy chief superintendent, stated that an inquiry held at the factory had revealed no definite cause of the explosion.

Mr. Hornel said he was employed in the blasting department, which included the power section in which were the hand cartridging houses. In these houses were two machines, at each of which two women were employed. There were no moving parts in the machines and all the operations were carried out by hand. That type of machine had been used at Ardeer for 30 years and there had been no previous accident.

The house in which the four women had been working had been completely destroyed. Mr. Hornel did not know of any safety device that had been neglected on the day of the accident.

## French Chemists Welcomed

THE cordial relationship between industrial chemists here and their French counterparts was fully evidenced by the character of the welcome extended in many quarters last week to the president, M. Robert Bienaimé, and the large party of officers and members of the Société de Chimie Industrielle during their visit to this country.

The delegates were entertained continuously from the time of their arrival on Sunday evening (May 7) until their departure a week later by some of the principal chemical and allied undertakings and the Society of Chemical Industry. The latter—some 33 years ago—provided the example stimulating the enterprise by Paul Kestner and Jean Gérard to which the French society owes its existence.

In addition to the long series of social events provided for their entertainment, the French group took full advantage of a long programme of visits to industrial centres, research institutes and the British Industries Fair.

## Artisone Imports

The Board of Trade reports that a licence is now required by United Kingdom importers of artisone and artisone acetate.

# • HOME •

### Temporary Duty Exemption

The Treasury has made an order exempting sodium antimonate from key industry duty for the period beginning May 13, 1950 and ending June 30, 1950.

### Salford Refinery Fire

Fire which started in the pump-house of a fractionating plant of an oil refinery at Salford last week threatened 8 million gall. of petroleum in 50 tanks. Firemen fought the blaze for an hour.

### Pharmaceutical Industry's Plans

The British pharmaceutical industry now has a productive capacity equivalent to £32 million a year, but it is planned to raise that to £56 million in the next year or two. This was recalled by Mr. J. Davidson Pratt, director of the ABCM, at the annual dinner, held recently in London, of the Association of British Pharmaceutical Industry.

### Readers' Pensions Committee

At the annual dinner of the Readers' Pensions Committee, in London last week, it was announced that this year's appeal under the chairmanship of Mr. Glanvill Benn had already exceeded last year's total and it was hoped by the end of the year to reach the second highest total since the organisation was formed 62 years ago. During that time 53 pensions have been founded and pensions provided for about 300 members.

### British Oxygen Factory Approved

A proposal by the British Oxygen Co., Ltd., to erect a factory to manufacture, compress and distribute industrial gases, on a 25-acre site between Carmyle and Mount Vernon, Glasgow, has been approved by the Lanarkshire County Council. The total floor area would be about 200,000 sq. ft., giving scope for employment of about 400 men. The company's other works in the Glasgow area will be transferred to the new site.

### Fatal Works Explosion

Firemen and troops searching for two persons missing in the explosion and fire at the Ironbridge (Salop) Metal Works on May 18, found the body of Mr. F. Frankel, the firm's managing director. It was lying under a mass of bricks near the furnace-room wall. A woman employee, Mrs. Kate Healey, was still missing, and the search for her continued after dangerous walls had been shored up. The factory building was half demolished on May 12.

### Oil Store Fire

A fire last week is reported to have destroyed a large store containing drums of oil at the premises of Ferguson and Menzies, oil refiners, Lawmoor Street, Glasgow.

### BAC Summer Tour

A visit to Chamonix, Mont Blanc, from July 30 to August 14, is being arranged by the London Section of the British Association of Chemists. Non-members may join the trip on application to the hon. secretary, Mr. H. Warson, 22 Gunton Road, E.5.

### New Water Pipe-line

The Tees Valley Water Board's £461,000 pumping scheme to provide water from the river at Low Worsall by direct pipe-line to the greatly enlarged works of I.C.I., Ltd., at Wilton, North Yorkshire, is expected to be ready for operation in August or early September, states the board's chairman.

### Textile Institute Membership

The election of 40 new members of the Textile Institute, at its meeting on May 17, brought the total to over 5000. The increasing attention given to the interests of juniors and students was emphasised in the institute's recent annual report. Thirty per cent—236—of all the members elected in 1949 were junior and junior student members. At December 31 their membership exceeded 600.

### Drum Manufacturers at Paris Fair

One of the largest British displays at the Paris Fair (May 18-29) will be that of the Van Leer organisation, which incorporates Metal Containers, Ltd. The fair coincides with the 80th anniversary of the group's foundation. To celebrate this Van Leer is erecting its own building to house a comprehensive range of its exhibits. A separate stand will show a self-powered mobile drum factory in operation, believed to be the first of its kind.

### Fatal Accident Sequel

A fine of £15, and 18s. 6d. costs, was imposed at the Hamilton Sheriff Court last week on the Lanarkshire Steel Company, Flemington, Motherwell, which had pleaded guilty to a contravention of the Factories Act, 1937, by failing effectively to prevent overhead cranes from travelling within 20 ft. of workmen repairing the roof on December 7. A workman was fatally crushed.

# OVERSEAS

### E. German Pharmaceutical Products

The Chemical Works Schwaan, Mecklenburg (Soviet Zone) is to increase its production of liver extract products and of ergostetriene. The works are in close touch with the Jenapharm enterprise in Jena.

### Dutch and Colonial Red Lead

A joint British-Dutch factory for the production of red lead is being put up at Hertogenbosch, Holland. A limited company under the style of Bourne Chemische Bedrijven N.V. will run the factory.

### Dutch Chemicals Total

Total turnover of chemical industries in Holland in 1949 amounted to about G.782.5 million. Exports accounted for more than 226.25 million guilders. Pharmaceutical articles, pigments and printers' ink, soap and detergents, sulphuric acid and superphosphate were the outstanding items of the total production. The aggregate number of chemical factories in Holland in 1949 was 459, employing 29,240 workpeople.

### Serum Factory in Ceylon

A scheme to establish a serum factory in the Uva province of Ceylon has been put forward by Dr. W. G. Wickremasinghe, director of medical and sanitary services, and has been approved by the Minister of Health, Mr. S. W. R. D. Bandaranaike. The project has met with some opposition on grounds that it would be uneconomic in view of the increased use of sulpha drugs. It is hoped, however, to export the serum to other countries in South East Asia.

### New Canadian Oil Refinery

The Anglo-American Oil Co., Ltd., announces the construction by Imperial Oil, Ltd., of a new 10,000-barrels-a-day refinery at East St. Paul, Manitoba. This has been made possible by the pipe line now being laid from Edmonton to Lake Superior to provide crude oil from Alberta. The completion of the plant, which is costing \$10 million, is scheduled for May, 1951. It will have Western Canada's first fluid catalytic cracking plant, which will produce high octane petrol. The refinery will also manufacture tractor distillate, stove oil, furnace oil and heavy industrial fuel. It has been designed so that additional refining facilities can be added as demand warrants.

### Methane Gas from the Saar

Three plants to produce methane gas are to be installed in Saar mines this year. The first installation which came into service at the end of 1949 was at Neuenkirchen.

### India Shellac Prices Fall

Small overseas demand, particularly from the U.S.A., has resulted in a sharp fall in the price of Indian shellac. The Indian Lac Committee has decided to spend some Rs.15,000 on publicity in the U.S.A.

### New DDT Plant for Mysore

A new DDT factory and technical institute is to be started shortly in Mysore. DDT has already been put to very good use in the State's drive for food self-sufficiency. One district is reported to have been cleared of mosquitoes, thus enabling the State to bring an additional 4500 acres of land under the plough.

### Cinchona Production

A Dutch-Belgian conference on the issue of cinchona production and processing into quinine salts will be held this month in Brussels. The attendance will include two representatives of Indonesia. The fact of this gathering denotes the importance the subject has acquired in the past few years, in which a factor has been the Congolese cultivation of cinchona bark.

### New Rubber Source in Hungary

Hungary is reported to have acclimatised a new rubber plant, imported from Russia, the roots of which contain a latex-like substance. Last year's harvest is claimed to have provided a rubber having a ductility equal to that of the tropical product and greater hardness. Its elasticity and resistance to wear and tear is admitted to be inferior.

### Australian Refining Progress

Crude oil from the Klamono field of Dutch New Guinea (THE CHEMICAL AGE, 62, 544) is now being refined in Australia, where the Vacuum Oil Company's plant at Altona, near Melbourne, recently started processing the first shipment of 15,000 tons. This development may enable the Commonwealth to save about \$1 million annually and implements Vacuum's programme of refining more than one-half of the country's requirements of lubricating oils. The Altona plant is the only refinery in Australia which treats crude oil without preliminary blending or treatment.

## The Stock and Chemical Markets

**A**LTHOUGH British Funds continued their rally, markets generally have remained cautious, particularly in the industrial section. These were affected by the many indications that, owing to higher railway freights and coal prices, etc., rising costs will this year reduce earnings of many companies unable to expand turnover.

Imperial Chemicals have eased further to 41s. 9d., although the full results for the past year's working and the impressive review covering all sections of I.C.I. activities, testify to the company's progressive policy.

The consolidated balance sheet of the company and 98 subsidiaries totals £203,081,956, compared with £191,949,218 at the end of 1948. Cash in hand, tax reserve certificates and holdings of British Government securities have declined from £12,744,108 to £4,298,777, but the excess of the company's current assets over current liabilities and provisions amounted to £28,921,610. On the other hand, commitments for capital expenditure total approximately £22 million. Trading profits of the group, including investment income, etc., were £27,172,116, compared with £31,171,207 in 1948. Tax was lower and consolidated income, less tax, was £10,826,681, against the previous year's £11,897,056, of which £9,791,503 (against £10,850,414) was applicable to the parent company.

Reserves receive £1.5 million, additional central obsolescence provision is £1.5 million and the dividend is again 10 per cent. A major factor explaining the lower earnings was contraction of selling prices abroad, particularly of the alkali and general chemicals division. This, coupled with increased costs, not at that time reflected in selling prices, caused the fall in trading profits, in spite of an increase in the total turnover from £164 million to £174.6 million.

In the industrial chemicals market, Monsanto Chemicals 5s. units strengthened to 48s., Fisons were 23s. 6d., Brotherton 19s. 3d. and F. W. Berk shares moved up to 15s. 6d. on the financial results. Dunlop Rubber eased to 61s. on the past year's figures, and Lever & Unilever, at 39s. 9d., easier, there being some doubts whether the Dutch Lever N.V. will be able to maintain its dividend. The 4s. units of the Distillers Co. were firmer at 17s. 6d., and United Molasses, at 42s. 6d., were firm.

Albright & Wilson were around 28s. 3d., Borax Consolidated 51s. 6d. and Glaxo

Laboratories around 46s. 6d. British Glues were 19s. 9d., De La Rue steadier at 20s. 9d. and British Xylonite fluctuated rather sharply around 73s. 9d. Turner & Newall were active up to 81s., pending the interim dividend announcement, and Boots Drug were up to 48s.

### Market Reports

**G**ENERALLY firm conditions prevail in the industrial chemicals market, the movement to the home consuming industries continuing at a satisfactory level. Export trade is again reported to be on a steady scale and it is reasonable to assume that a certain amount of new business has developed as a result of the British Industries Fair. The fluctuations in non-ferrous metal prices continue and the recent upward movement in the price of lead has brought about three changes in a week in the convention quotations for white and red lead. The basis price for the former is now £123 10s. per ton and for dry red lead £114 5s. per ton. The zinc oxides are also dearer. With the approach of the peak seasonal period for tartaric acid and cream of tartar, the prices of both are slightly lower at 165s. per cwt. and 142s. per cwt., respectively.

**MANCHESTER.**—Advances in several sections of the Manchester chemical market, arising from the increase in transport costs and the consequent stiffening of prices of fuel and other raw materials, have been reported during the past week. Announcements are, however, still awaited in respect of the majority of products. Among the increases so far is that of one shilling a ton in all grades of sulphuric acid. Lead and zinc compounds are also dearer, chiefly in sympathy with movements in the metals. A fair home and export business has been reported during the past week in the leading heavy chemicals and also in most of the tar products.

**GLASGOW.**—The demand for chemicals in Scotland continues to increase and the volume of chemical business being transacted is probably higher than at any time in the past. There is at the moment a shortage of certain products as a result of the recent fire at a large chemical works. The coal tar products, which were already in short supply, being particularly affected. The shortage does not appear as yet to have caused any serious hold-ups among the consuming industries.

## Law and Company News

### Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

#### Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an \*—followed by the date of the Summary, but such total may have been reduced.)

CHROMOCINE, LTD., London, W., chemical manufacturers, etc. (M., 20/5/50.) April 18, £7000 charge and debenture, to N. H. Dewhurst & Co., Ltd.; charged on 158/168 Kensal Road, W.10, undertaking and all property and assets (other than the freehold property) both present and future including the uncalled capital. £4000. July 12, 1950.

DIAZAPOL DYE & CHEMICAL CO., LTD., Accrington. (M., 20/5/50.) April 18, charge to Halifax Building Society, securing £600 and further advances, charged on 297 Bury Road, Tottington. \*Nil. Dec. 23, 1947.

#### Satisfaction

LAKE, ORR & CO., LTD., London, S.E., wax, paint manufacturers, etc. (M.S., 20/5/50.) Satisfaction April 21, of charge registered January 27, 1936.

## Company News

#### The Dunlop Companies

The consolidated operating profit of the Dunlop group for 1949 was £9,480,850, as against £10,768,876 for 1948. The net profit, after tax, of the Dunlop Rubber Co., Ltd., was £2,947,890, as against £2,924,280 in 1948. A dividend of 12 per cent and a bonus of 3 per cent, less tax (same) on ordinary stock, is recommended.

#### Greef-Chemicals Holdings, Ltd.

The directors of Greef-Chemicals Holdings, Ltd., are recommending payment of a final dividend on the ordinary stock of 8½ per cent and a bonus of 3½ per cent, less tax, making a total for 1949 of 12½ per cent plus the bonus. The profit for the group for the year ended December 31 was £62,741 (£73,461).

#### The International Nickel Co. of Canada, Ltd.

The net profit of the International Nickel Company of Canada, Ltd., for the quarter ended March 31, 1950, was (U.S.) \$8,329,015, equivalent, after preferred dividends, to 54 cents per share on the common stock. Net sales in the first quarter of this year of \$47,392,082 compared with \$44,895,721 in the previous quarter and \$55,624,831 in the corresponding period of 1949.

#### Montecatini Results

The Montecatini company, of Milan, Italy, reports a net profit for 1949 of lire 3873.7 million (lire 3175.7 million in 1948). An unchanged net dividend of 12 per cent is being paid on the increased share capital of lire 30 million (lire 24 million in 1948).

#### Increases of Capital

The following increases in registered capital have been announced:—ALLIED COLLOIDS (BRADFORD), LTD., from £20,000 to £40,000; CLECKHEATON CHEMICAL CO., LTD., from £35,000 to £61,000; CLAYTON & JOWETT, LTD., from £40,000 to £65,000; DEXTRAN, LTD., from £5000 to £30,000; A. IBBETSON & CO., LTD., from £100 to £20,000; HEADMAN & HOLDEN, LTD., from £150,000 to £300,000; JOHN HARLEY, LTD., from £5000 to £100,000; HIGHLINE PRODUCTS, LTD., from £3000 to £10,000; LINCOLNSHIRE CHEMICAL CO., LTD., from £15,000 to £30,000.

The capital of METALLO CHEMICAL TRUST, LTD., (which has become a public company) has been increased by £270,000 by the issue of 6 per cent preference, 5 per cent preferred and unclassified shares beyond the registered capital of £130,000.

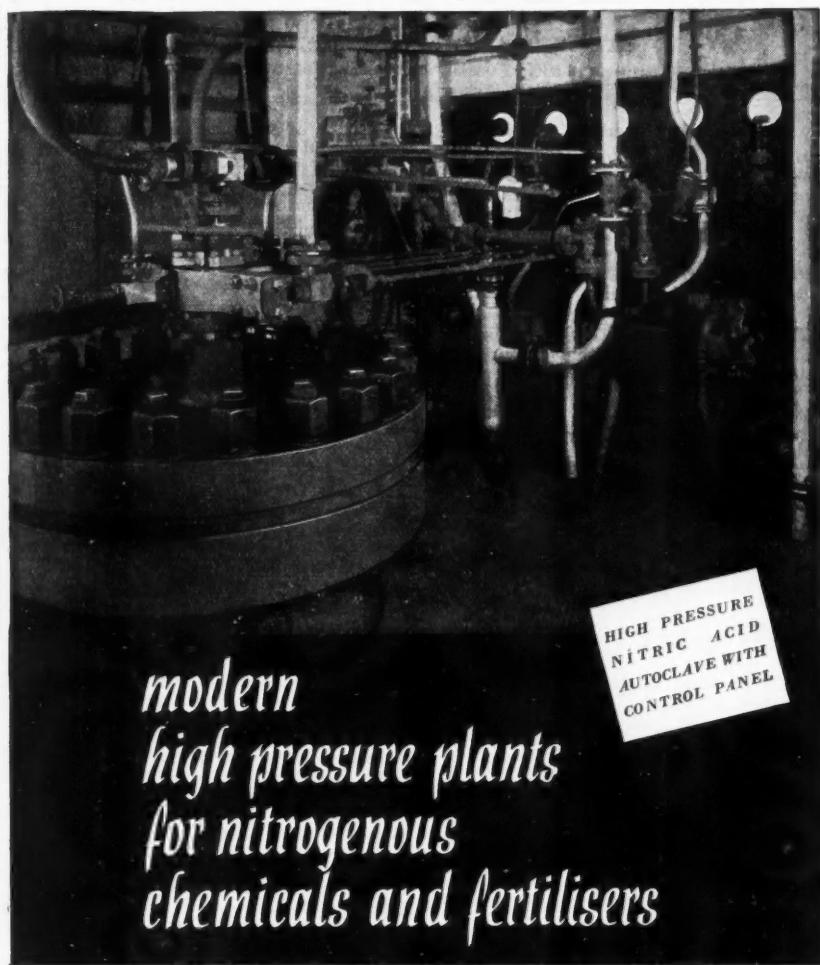
## New Registrations

#### Hughes' P.3 Detergents, Ltd.

Private company. (481,795.) Capital £100. Directors: M. D. Hughes and D. G. Higgs. Reg. office: 67 Moorgate, E.C.2.

#### Universal Crop Protection, Ltd.

Private company. (481,870.) Capital £10,000. Manufacturers of insecticides, fungicides, weedkillers, fertilisers and all chemical and other products for agricultural purposes; to undertake operations in any part of the world relating to the protection of crops, etc. Reg. office: Baltic House, 27 Leadenhall Street, E.C.3.



*modern  
high pressure plants  
for nitrogenous  
chemicals and fertilisers*

**B A M A G**

L I M I T E D

COMPLETE CHEMICAL PLANT

**RICKETT STREET, LONDON, S.W.6, ENGLAND**

Telephone: FULham 7761      Telegrams: Bamag, Walgreen, London

*Sales and Export Department:*

UNIVERSAL HOUSE, 60 BUCKINGHAM PALACE ROAD, LONDON, S.W.1  
SLOane 9282      Cables: Bamag, London

## Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2 at 2s. each. Higher priced photo-tat copies are generally available.

### Complete Specifications Accepted

Method for joining non-metallic thermoplastic materials.—Udylite Corporation. Aug. 7, 1947. 637,881.

Alloy steels.—Birmingham Small Arms Co., Ltd., and G. T. Harris. Dec. 9, 1948. 638,110.

Production of sintered bodies from metal powders.—D. Primavesi. Dec. 29, 1947. 638,114.

Process for the production of vinylidene-chloride.—Naamlooze Vennootschap De Bataafsche Petroleum Maatschappij. Jan. 27, 1948. 638,117.

Manufacture of biguanide derivatives.—Imperial Chemical Industries, Ltd., S. Birtwell and F. L. Rose, and M. R. Curd (legal representative of F. H. S. Curd (deceased)). Jan. 5, 1949. 637,892.

Compositions comprising polymeric materials.—Imperial Chemical Industries, Ltd., D. H. Coffey, O. B. Edgar, T. J. Meyrick, and J. T. Watts. Jan. 28, 1949. 638,118.

Preparation of dialkyl-substituted dihalogenosilanes.—British Thomson-Houston Co., Ltd. Feb. 25, 1948. 637,941.

Production of a  $\beta$ -dimethylenesuccinonitrile.—United States Rubber Co. March 24, 1948. 637,902.

Preparation of hydroxy aromatic carboxylic acids.—Ilford, Ltd., and D. J. Fry. May 9, 1949. 638,196.

Thermoplastic materials.—Compagnie Générale d'Électricité. Nov. 21 1945. 638,742.

Manufacture of acaricidal and disinfectant compositions.—R. M. Hughes. (J. R. Geigy A.G.). July 24 1947. 638,662.

Recovery of antibiotic substances.—Ayerst, McKenna & Harrison, Ltd. Aug. 27 1946. 638,664.

Adsorption process and apparatus.—Union Oil Co. of California. Sept. 24 1946. 638,745.

Process and apparatus for pelleting dry, flocculent carbon black.—Phillips Petroleum Co. Nov. 19 1946. 638,863.

Manufacture of drying oil substitutes or extenders.—Lobitos Oilfields, Ltd., M. Ingram, and D. H. Tullis. March 9 1948. 638,750.

Electrodeposition of nickel from an acid bath.—Udylite Corporation. April 19 1947. 638,867.

Process of preparing acetoxyethyl salicylate and acetoxyethyl salicylate and of preparing 4-keto-1, 3-benzodioxane, and 2-methyl-4-keto-1, 3-benzodioxane therefrom.—Monsanto Chemical Co. May 7 1947. 638,556.

Synthesis of primary alcohols.—E. I. Du Pont de Nemours & Co., and W. F. Gresham. May 16 1947. 638,754.

Conversion of fluid reactants in the presence of subdivided solid catalyst particles.—Universal Oil Products Co. June 17 1947. 638,873.

Detergent composition.—Procter & Gamble Co. June 17 1947. 638,637.

Process of and apparatus for obtaining finely divided precipitates.—Solvay & Cie. July 1 1947. 638,564.

Process for the manufacture of aromatic mercury compounds which contain mercury connected to the nucleus.—Spolek Pro Chemickou a Hutni Vyrobu, Narodni Podnik. July 8 1947. 638,565.

Process for the emulsion polymerisation of polymerisable substances.—N.V. De Bataafsche Petroleum Maatschappij. July 16 1947. 638,640.

Plasticised vinyl halide compositions.—B. F. Goodrich Co. July 17 1947. 638,567.

Plasticised vinyl polymers and process of plasticising same.—B. F. Goodrich Co. July 22 1947. 638,570.

Pearl polymerisation of vinyl compounds.—W. P. Hohenstein. July 30 1947. 638,572.

Manufacture of carbon bisulphide.—Hardman & Holden, Ltd., and H. S. Land. Aug. 28 1948. 638,676.

Production of protective phosphate coatings on metal surfaces.—Westinghouse Electric International Co. Sept. 26 1947. 638,889.

Insecticidal compositions.—R. C. Noyes. (Hercules Powder Co.). Sept. 30 1947. 638,678.

Liquid polysiloxanes.—British Thomson-Houston Co., Ltd. Oct. 8 1947. 638,586.

Method of purifying zinc electrolytes.—Hudson Bay Mining & Smelting Co., Ltd. Oct. 14 1947. 638,651.

Ceramic dielectric materials and methods of manufacturing the same.—C. E. Every. (Titanium Alloy Manufacturing Co.). Oct. 17 1947. 638,884.

Bituminous compositions.—Shell Refining & Marketing Co., Ltd., and P. J. Gardner. Oct. 18 1948. 638,654.

Process for the preparation of esters.—N.V. De Bataafsche Petroleum Maatschappij. Oct. 28 1947. 638,763.

Apparatus adapted for use in pH determination.—Muirhead & Co., Ltd., and E. W. Tucker. Oct. 5 1948. 638,718.

Reduction of gases rich in carbon dioxide.—Stord Kopparbergs Bergslags A/B. Dec. 23 1947. 638,719.

Cyclic acetals.—E. I. Du Pont de Nemours & Co. Dec. 23 1947. 638,895.

Processes of preparing antihistaminic compositions and the compositions resulting from said processes.—G. D. Searle & Co. Jan. 22 1948. 638,606.

Apparatus for collecting predetermined quantities of gas.—Gas Light & Coke Co., and L. Silver. Jan. 11 1949. 638,608.

Manufacture of biguanide derivatives.—I.C.I., Ltd., S. Birtwistle, and F. L. Rose, and M. R. Curd. [Legal representative of F. H. S. Curd (deceased)]. Jan. 5 1949. 638,695.

Process for production of carbon monoxide.—Power-Gas Corporation, Ltd., and K. Ruschin. Jan. 29 1949. 638,769.

Manufacture of flux-coated aluminium welding electrodes.—Murex Welding Processes, Ltd., and E. C. Rollason. March 30 1949. 638,731.

Zinc casting alloys.—British Thomson-Houston Co., Ltd. April 9 1948. 638,733.

Absorptiometer.—I.C.I., Ltd., and R. P. Kinsey. May 26 1949. 638,740.

Manufacture of metallic titanium.—British Aluminium Co., Ltd., and L. Saunders. July 4 1949. 638,840.

Treatment of carbon to render it more active.—Hardman & Holden, Ltd., and H. S. Land. Aug. 28 1948. 638,700.

Adhesives for bonding plasticised polyvinyl halide-containing resins and articles bonded thereby.—G. L. Martin Co. May 24 1945. 639,185.

Purification of aluminium and magnesium.—National Smelting Co. July 25 1946. 638,904.

Treating magnesium bearing brines.—W. W. Triggs. (Dorr Co.). Oct. 4 1946. 639,123.

Diazo-type papers containing an alginate sizing.—General Aniline & Film Corporation. Dec. 2 1946. 638,908.

Culture media for the propagation of vegetative organisms. A. Dinsley. Dec. 3 1947. 638,987.

Electrostatic treating process.—H. C. Lord, T. Lord, and B. M. H. Lord [trading as L.L.H. Co.]. Dec. 6 1946. 639,046.

Annealing of glass.—Pittsburgh Corning Corporation. Jan. 6 1947. 639,049.

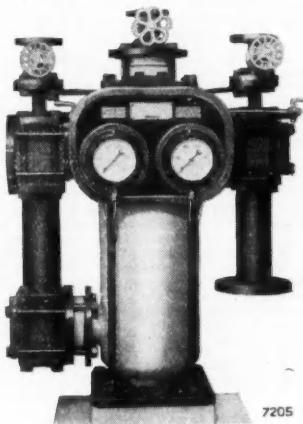
Process for dewaxing mineral oils.—N.V. De Bataafsche Petroleum Maatschappij. Jan. 30 1947. 639,128.

Production of sheets of polymeric resin.—I.C.I., Ltd., and A. L. L. Tompsett. Feb. 18 1948. 639,199.

*Mirrlees*

## A Special Steam Ejector Air Pump

Designed for the production and maintenance of Vacuum, and developed to meet the needs of a section of the Chemical Industry.



7205  
NO METAL PARTS  
IN CONTACT WITH  
CORROSIVE GASES

COMPRESSION STAGES OF CARBON.  
CONDENSER OF PORCELAIN.

*MIRRLEES WATSON*  
COMPANY LIMITED  
SCOTLAND ST. GLASGOW

# CLASSIFIED ADVERTISEMENTS

## SITUATIONS VACANT

**A**SSISTANT Works Chemist required by well-established London manufacturing chemists to under-study chief chemist, test raw materials, etc. Position offers wide scope and excellent prospects in rapidly expanding sections of the business. Previous disinfectant and soap experience an advantage and training up to intermediate or final degree standard desirable. Salary according to experience, but applicants should state amount expected. Applications in writing, giving complete details of age, qualifications, experience and present and former employers (which will be treated in the strictest confidence), should be sent to MANAGING DIRECTOR, Box CA 2914, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

**CHEMICAL ENGINEERS.** Excellent prospects and permanency offered to experienced Chemical Engineers by The Bahrain Petroleum Company Limited, Persian Gulf. Applicants must possess a B.Sc. Degree or equivalent from a recognised Engineering School. Men, who in addition to their Chemical Engineering training, have had training in Mechanical Engineering and practical experience in designs problems applicable to the distillation and fractionation of hydrocarbons common to crude oil and coal-tar refining or chemical plants and other allied industrial processes, are preferred. Salaries according to qualifications and experience, plus kit allowance, provident fund, free board, air-conditioned living accommodation, medical attention and transportation costs. Agreements, 24 to 30 months, with paid leaves. Write, giving full particulars of qualifications, age, education, experience and salary required, to Box 3427, c/o Charles Barker & Sons, Ltd., 31, Budge Row, London, E.C.4.

**CIVIL ENGINEERS.** Excellent prospects and permanency with Bahrain Petroleum Company Limited, for Civil Engineers not over 40 years of age, with Degree and experience of design and erection of steel and reinforced concrete supporting structures as encountered in oil refinery or similar heavy chemical process plants. Twenty-four to thirty months agreements, with passages paid, kit allowance, provident fund, paid leaves, free messing and air-conditioned accommodation. Low living costs. Write, with full particulars of age, experience, education and salary required, to Box 3428, c/o Charles Barker & Sons, Ltd., 31, Budge Row, London, E.C.4.

### CHEMICALS SALESMAN REQUIRED BY ATHOLE G. ALLEN (LONDON) LTD.

**CHEMICAL MERCHANTS & DISTRIBUTORS,**  
PRINCES WHARF,  
135, GROSVENOR ROAD,  
LONDON, S.W.1.

Must have experience of HOME and EXPORT markets. Applicants are requested to write, stating full particulars of qualifications, experience and remuneration required.

## SITUATIONS VACANT

**T**HE Civil Service Commissioners invite applications for permanent appointments as **ASSISTANT EXPERIMENTAL OFFICER**, to be filled by competitive interview during 1950. Interviews will be held throughout the year, but a closing date for the receipt of applications earlier than December, 1950, may eventually be announced either for the competition as a whole or in one or more subjects. Successful candidates may expect early appointments.

The posts are in various Government Departments and cover a wide variety of Scientific (including Engineering) qualifications. Places of work are spread throughout Great Britain.

Candidates must be at least 17½ years and under 26 years of age (or under 31 for established Civil Servants of the Assistant (Scientific) Class) on 1st August, 1950; time spent on a regular engagement in H.M. Forces may be deducted from actual age. Candidates must have obtained the Higher School Certificate with Mathematics or a Science subject as a principal subject, or an equivalent qualification; but candidates without such qualifications may be admitted exceptionally on evidence of suitable experience. Higher qualifications will be regarded as an advantage to candidates over the age of 20.

The inclusive London salary scale (men) is £230-£490. Salaries for women and for posts in the Provinces are somewhat lower. Superannuation provision is made under the Superannuation Act.

Further particulars and forms of application from the Secretary, Civil Service Commission, Scientific Branch, 7th Floor, Trinidad House, Old Burlington Street, London, W.1, quoting No. 3068. Completed application forms should be returned as soon as possible. 6742/250/DVL.

**T**HE Civil Service Commissioners invite applications for appointments as **SENIOR SCIENTIFIC OFFICER** and **SCIENTIFIC OFFICER**, to be filled by competitive interview during 1950. Interviews began in January and will continue throughout the year, but a closing date for the receipt of applications earlier than December, 1950, may eventually be announced. Successful candidates may be appointed immediately. The posts are in various Government Departments and cover a wide range of Scientific research and development in most of the major fields of Fundamental and Applied Science. Candidates must have obtained a University Degree in a Scientific subject (including Engineering) or in Mathematics, with First or Second-class Honours, or an equivalent qualification, or possess high professional attainments. Candidates for Senior Scientific Officer posts must in addition have had at least three years' Post-Graduate or other approved experience. Candidates for Scientific Officer posts taking their degrees in 1950 may be admitted to compete before the result of their Degree examination is known.

Age limits: For Senior Scientific Officers, at least 26 and under 31 on 1st August, 1950; for Scientific Officers, at least 21 and under 28 (or under 31 for established Civil Servants of the Experimental Officer Class) on 1st August, 1950.

Salary scales for men in London: Senior Scientific Officers, £700 by £25 to £900; Scientific Officers, £400 by £25 to £650. Rates for women are somewhat lower.

Further particulars from The Secretary, Civil Service Commission (Scientific Branch), 7th Floor, Trinidad House, Old Burlington Street, London, W.1, quoting No. 2887. 4993/200.

## SITUATIONS VACANT

**DESIGNER** for new process plant and buildings and preparation of layout and arrangement drawings in a large Chemical Works. Applicants should have had Engineering Shop training, possess Higher National Certificate in Mechanical Engineering or similar qualifications; also experience of detail design and layout work for chemical plant. Applicants should be about 30. Substantial salary will be paid to man with ability, enthusiasm and sound experience. Bonus and Superannuation Schemes are in operation. Write, Chief Engineer, **ALBRIGHT & WILSON, LTD.**, Oldbury, Birmingham.

**DESIGNERS ENGINEERS.** Excellent prospects and permanency with Bahrain Petroleum Company Limited, for Mechanical Engineers, not over 40 years of age, with B.Sc. Degree or equivalent qualifications. Experience required in design and/or construction of oil refineries, coal-tar, chemical distillation plants, or similar involving electrical and steam systems, pressure vessels, fractionating columns, heat exchanges and pumping equipment. Twenty-four to thirty month agreements, with passages paid, kit allowance, provident fund, paid leaves, free messing and air-conditioned accommodation. Low living costs. Write, with full particulars of age, experience, education and salary required, to Box 3429, c/o Charles Barker & Sons, Ltd., 31, Budge Row, London, E.C.4.

**RESEARCH MANAGER** Scottish Agricultural Industries, Ltd., Edinburgh, invite applications for a Research Manager, to organise and lead a research unit about to be set up (probably in the Edinburgh district), to investigate scientific and technical problems of chemical fertiliser manufacture. Applicants should have Honours Degree in Chemistry (preferably Inorganic and Physical), good research experience, including knowledge of modern physico-chemical techniques, and the ability to initiate, supervise and carry out experimental work. The position is permanent and pensionable and will command a high salary; the initial salary will be determined by the age, qualifications and experience of the successful applicant. Apply **Secretary, S.A.I., Ltd.**, 39, Palmerston Place, Edinburgh, 12.

## FOR SALE

**CHARCOAL, ANIMAL and VEGETABLE**, horticultural, burning, filtering, disinfecting, medicinal; insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—**THOS. HILL-JONES, LTD.**, "Invicta" Mills, Bow Common Lane, London, E. Telegrams, "Hilljones", Bochurch, London, Telephone: 3285 East.

## NEW STAINLESS STEEL PLANT

For all needs

**REACTION VESSELS, STILLS, TANKS, BUCKETS, BOILING PANS, ROAD TANKS, ETC.**  
**SPECIAL ATTENTION TO EXPORT**

We specialise in finding unusual secondhand items for our customers. If you do not receive our monthly list, please let us have your address. May we help you? We are not dealers but only supply plant on commission.

**R. F. PAGET,**

Chemical and General Engineer,

**MANOR HOUSE, BARWICK-IN-ELMET, LEEDS**  
Tel: Barwick-in-Elmet 216.

## FOR SALE

**600**

**GAS** fired **INFRA RED TUNNEL** approx. 40 ft. centres (30 ft. sheet metal cover), with 14 in. wide endless chain conveyor to carry wire mesh trays. Infra-red filter heaters, 21 in. by 9 in., 12 each side externally and 6 each side in alternate positions internally. Tunnel stands 4 ft. 6 in. high on angle iron framework. Conveyor driven by **TUSCON** 1½ h.p. flame-proof geared motor, 400/3/50 cycles 1,440 r.p.m. with double reduction gear and **ALLEN WEST** push button starter.

**TUNNEL KILN** by **INCANDESCENT HEAT CO.**, approx. 120 ft. long, oil fired, three zone controlled and six zone temperature recorder and controller, range 0/1,400° C. 32 four wheel trolleys for 2 ft. gauge track each trolley approx., 46 in. by 42 in. by 36 in. overall height, worm operated pusher gear and chain operated discharge. Steel chimney approx. 30 ft. high. Electrical gear, 400-440/3/50 cycles. Black painted metal cabinet by **ELECTRO-FLO** approx., 4 ft. by 3 ft. by 1 ft. 6 in. with temperature indication and recording for various zones with warning lights.

Horiz. cylindrical dish-ended **M.S. STORAGE TANK**, 30 ft. long by 9 ft. diam. fitted heating coil and mounted on C.I. cradles with gauge.

Six jacketed **MIXERS** by **BAKER PERKINS**, trough 31 in. by 2½ in. by 28 in., twin fin or **NABEN** type blade agitators. Tilting through vert. back lead screw by hand wheel. Troughs fitted aluminium cover with 4 wing-nut securing bolts. Mixers direct driven by 3-h.p. T/E geared motor by B.T.H. 400-440/3/50 cycles 1,455 r.p.m. with igninic floor mounting starter. Forward and reversing switch by **BROOKHIRST** incorporated.

**DRUMMOND ABN** 12 ton hyd. press, self-contained motor 2-h.p. **LAURENCE SCOTT**, 400/3/50 cycles 1,440 r.p.m. Press 12 tons on 2½ in. diam. ram, new 1940. No. 78139. Slotted table 24 in. by 13½ in. with hand lever operated ejection and control valve.

Two heavy hand wheel operated **CRANK PRESSES**, arranged hand lever ejection and alternatively compressed air, table, 24 in. by 13½ in. with wheel operated screw adjustment.

Five medium **CRANK PRESSES**, as above, but with tables 20 in. by 12 in.

Twelve small **CRANK PRESSES**, hand wheel operated, slotted tables, 18 in. by 11 in., with foot and hand operated ejection. Table adjustable by screw for position.

**CARRIER DRYING OVEN**, oil or gas fired, 7 ft. high by 6 ft. wide by 8 ft. long.

**GEORGE COHEN SONS & CO. LTD.**,  
**SUNBEAM ROAD**, LONDON, N.W.10.

Tel: Elgar 7222 and

**STANNINGLEY, NR. LEEDS**

Tel: Pudsey 2241

CHEMICAL PLANT FOR IMMEDIATE DISPOSAL  
**ALUMINIUM TANKS**

Two 6 ft. 10 in. by 5 ft. 9 in. diam., open top; four 5 ft. 8 in. by 3 ft. 9 in. diam., enclosed.

**SPECIAL TANKS**

20 ft. by 4 ft. by 2 ft. 8 in., copper open top.

Two Pfaudler Enamel lined, 6 ft. diam.

Four, 30 ft. by 9 ft. welded, dish ended, 7 in. plate.

Six steam **DISINFECTORS**, 7 ft. long, 3 ft. diam.

**STEAM BOILERS**—400 in stock, new and reconditioned also **AIR COMPRESSORS**, **MIXERS**, **REDUCTION GEARS**, **PIPES**, **JACKETED STEAM PANS**, etc.

Send for illustrated catalogue containing 5,000 items—

**"WATKINS' MACHINERY RECORD"**

**WEDDING WATKINS, COLEFORD, GLOS.**

Phone: Coleford 2271/2

## FOR SALE

## VARIOUS MIXERS FOR SALE

No. 200 **ONE** nearly new **WERNER PFLEIDERER** **JACKETED MIXER OR INCORPORATOR.** **Large** type, with C.I. built mixing chamber, 29 in. by 29 in. by 27 in. deep, with double "U" shaped bottom which is jacketed, and double fish-tail or fin-type agitators geared together at one side, with belt-driven friction pulleys, 34 in. diam. by 5 in. face, with hand-wheel operation and hand-operated screw tilting gear. Machine fitted with machine-cut gears, covers, gear guard, cast-iron baseplate, and measuring overall approximately 7 ft. by 6 ft. by 4 ft. high to the top of the tipping screw

No. 201 One **DITTO.**

No. 202 One **DITTO.**

No. 204 One **WERNER PFLEIDERER MIXER OR INCORPORATOR**, similar to the above, with a C.I. built pan 25 in. by 25 in. by 19 in. deep, belt pulleys 26 in. diam. by 5 in. face, double fin-type agitators, and mounted on C.I. legs.

No. 205 One larger **WERNER-TYPE MIXER OR INCORPORATOR**, by Dobson & Barlow, with C.I. built pan or mixing chamber, of the double "U" type, 4 ft. 6 in. by 3 ft. 7 in. by 3 ft. 10 in. deep, with a jacketed bottom and sides to within about 12 in. of top, and fitted with double "Z" type agitators, counterbalanced cover, machine-cut gears at each side, steel back-frame with counterbalancing weights and self-contained belt-driven tipping gear and main triple fast and loose belt pulleys 30 in. diam. by 6 in. face, with belt fork. Approximate overall sizes, 12 ft. long by 8 ft. wide by 10 ft. high.

No. 206 One **DITTO** of the same pattern, by **DOBSON & BARLOW**

No. 208 One **DITTO** by **WERNER PFLEIDERER**, with a C.I. built pan or mixing chamber, of the double "U" type, 4 ft. 5 in. long by 3 ft. 8 in. by 33 in. deep, with double "Z" mixing arms, gears at each end, hand-operated tilting gear, with steel backframe, counterbalancing weights and chains, and fast and loose pulleys 3 ft. diam. by 6 in. face.

No. 209 One **HORIZONTAL "U"-SHAPED MIXER**, steel built, riveted, measuring about 8 ft. 3 in. long by 3 ft. wide by 3 ft. 3 in. deep, with horizontal shaft, fitted with bolted-on mixing arms about 18 in. long by 4 in. wide, with intermediate breakers, and driven at one end by a pair of spur gears, with countershaft, fast and loose belt pulleys, outer bearing and plug cock type outlet at the opposite end, mounted on two cradles fitted to two R.S.J. running from end to end.

No. 210 One **HORIZONTAL MIXER** as above.

No. 211 One **HORIZONTAL MIXER** as above.

No. 212 One **HORIZONTAL MIXER** as above.

No. 213 One **HORIZONTAL MIXER** as above.

These five "U"-shaped mixers are in some cases fitted with steel plate covers and a steam jacket round the bottom and extending to within about 18 in. of the top with plain end plates.

Further details and prices upon application

Write **RICHARD SIZER LIMITED, ENGINEERS**  
**CUBER WORKS HULL.**

**19** tons **DI-ISOBUTYLENE**—immediate delivery. Samples available on request. Box No. C.A. 2920, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

## FOR SALE

## MORTON, SON &amp; WARD LIMITED

## —OFFER—

## MISCELLANEOUS CHEMICAL PLANT

**ONE**—Mild Steel **Jacketed COPPER BOILING PAN** with pouring lip measuring 2 ft. diam. by 2 ft. deep. Mounted on C.I. "A"-frame with trunnion bearings. Pan jacketed to within 12 in. of top. Overall height to top of pan, 3 ft. 3 in. W.P., 60 lb. per sq. in.

**ONE**—Mild Steel **Jacketed STAINLESS STEEL PAN**, open top, hemispherical bottom, side outlet. Pan measuring 3 ft. 6 in. diam. by 2 ft. 6 in. deep. W.P., 30 lb. per sq. in.

**ONE**—**WEIR BOILER FEED PUMP**, 4 in. by 6 in. by 12 in. approx. Maker's No. 178841. Complete with  $\frac{1}{2}$  in. main steam valve, 1 in. exhaust outlet, 2 in. suction, 1 $\frac{1}{2}$  in. delivery.

**THREE**—Rubber-lined Mild Steel **RECTANGULAR STORAGE TANKS**, 5 ft. 6 in. by 2 ft. 6 in. by 2 ft. 3 in. deep.

**ONE**—26 in. **BROADBENT HYDRO EXTRACTOR**, flat belt drive, 3 h.p. motor, squirrel cage A.C. 400/3/50 cycles, complete with starter mounted on C.I. pillar. Spare basket, detachable type.

**ONE**—**SHARPLES CENTRIFUGE**, Type M53, with 1.5 h.p. motor, squirrel cage, 400/3/50 at 2,850 r.p.m.

**NEW**—**MORWARD POWDER MIXERS** with trough 4 ft. long by 2 ft. wide by 2 ft. deep, or 6 ft. by 2 ft. by 2 ft. Driven through fan-cooled gearbox from 6 h.p. motor, 400/3/50 cycles supply, complete with starter.

## MORTON, SON &amp; WARD LIMITED

## WALK MILL, DOBGROSS,

## MR. OLDHAM, LANCS.

\*Phone: Saddleworth 437.

**FLOORING PLATES.** We carry good stocks of Steel Plates in Armour-Plate and hard qualities suitable for flooring and other purposes. All thicknesses up to 7 in. in random sizes or acetylene cut to specification. At cheap prices. Full details on application.

**THOS. W. WARD, LTD., ALBION WORKS,**  
**SHEDFIELD.**

**MORTON** 30-quart **GRID LAP MIXER** for sale. 1 cwt. capacity, handwheel tilting, complete with 2-speed gearbox and 5 h.p. electric motor. Completely overhauled. Price £200. Box No. C.A. 2921, THE CHEMICAL AGE, 154 Fleet Street, London, E.C.4.

**ONE** Belt-driven **MIXING MACHINE** by **GARDNER**, U-shaped tilting trough, 18 in. by 18 in. by 24 in. deep. Blades revolving in opposite direction. Good condition. Price: £90.

**THOMPSON & SON (MILLWALL) LTD.,**  
**CUBA STREET, MILLWALL, E.14.**

**ONE** Copper-jacketed **PAN**, 24 in. diam. by 18 in. deep, mounted on 4 legs. Good condition. Price: £35.

**THOMPSON & SON (MILLWALL) LTD.,**  
**CUBA STREET, MILLWALL, E.14.**

## PLYWOOD TEA CHESTS

Truck Loads Only

FOR REGULAR SUPPLIES—write

**E. W. E. NAYLOR**  
Wolverhampton St., BILSTON, STAFFS.

## FOR SALE

**O**NE new MORTON AD60 MODEL MIXER, complete with motor.

Two new MORTON RBS MIXERS, 25 gallons capacity, driven by integral 400 volts, 3-phase, 50 cycles motors with 2-speed gearbox giving 58/35 r.p.m. on slow and 170/103 on high speed.

Suspended-type Overdriven HYDRO EXTRACTORS by Thos. Broadbent, 42 in. diam. mild steel basket, having a flameproof motor running at two speeds—48/960 r.p.m. bottom discharge.

**REED BROTHERS (ENGINEERING) LIMITED,**  
CUBA STREET,  
MILLWALL, E.14.

**O**NE 3-ton SMITH STEAM LOCO. CRANE, No. 9887, 4 ft. 8½ in. gauge. Jib, 25 ft. long. Boiler, 100 lb. w.p. Very good condition. Low price for quick sale. Apply G. E. SIMM (MACHINERY) LTD., East Parade, Sheffield, 1.

**"PERMUTIT"**  
Water Purification Plant  
New Unused

12 Sets each with capacity of 2,000 gall. per hour.  
Inspection our works,

**MADEN & MCKEE LTD.,**  
317 Prescot Road,  
LIVERPOOL, 13.

**PHONE 98 STAINES**

**T**WO—WATSON LAIDLAW ELECTRIC HYDROS, 30 in monel basket.

**SIMON REVOLVING TUBE DRIER**, 90 sq. ft. tube area. **TWIN "Z" BLADE ELECTRIC MIXER**. Tinned pan, 30 in. by 28 in. by 22 in. deep.

**LABORATORY FILTER PRESS**, 4-plate, 3 frames, 7½ in. sq., ½ in. cake.

3-in. ELECTRIC "CARRIER" CENTRIFUGAL PUMP, 400/3/50.

**HARRY H. GARDAM & CO., LTD.,  
STAINES**

**1000 STRONG NEW WATERPROOF APRONS.** To-day's value 5s. each. Clearing at 30s. dozen. Also large quantity Filter Cloths, cheap. Wilsons, Springfield Mills, Preston, Lancs. Phone 2198

## WANTED

**C**ELLULOSE LACQUER, MIXERS AND ROLL-MILL wanted, suitable for small-scale production, clear and pigmented lacquer. Box No. C.A. 2918, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

**WANTED REGULARLY**  
for treatment in our own works,

## RESIDUES

containing:  
Cadmium, Zinc,  
Copper, Lead,  
Tin, Nickel.

Offers to: **OAKLAND METAL CO. LTD.**,  
Oakland Works, Willington, Derby.  
Telephone No.: Repton 391/392

**VERTICAL MIXERS** wanted, suitable for heavy paste, for pans about 20 in. diameter or larger; also suitable pans, jacketed and plain. Box No. C.A. 2917, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

## PATENTS &amp; TRADE MARKS

**KING'S PATENT AGENCY, LTD.** (B. T. King, A.M.I.Mech.E., Patent Agent), 146a, Queen Victoria Street, London, E.C.4. ADVICE Handbook, and Consultation free. Phone: City 6161.

## SERVICING

**D**OHM, Ltd., pulverise raw materials everywhere 167, Victoria Street, London, S.W.1.

**G**RINDING, Drying, Screening and Grading of materials undertaken for the trade. Also Supplier of Ground Silica and Fillers, etc. **JAMES KENT, LTD.**, Millers' Feeton, Staffordshire. Telegrams: Kenmill, Stoke-on-Trent. Telephone 4253 and 4254, Stoke-on-Trent (2 lines).

**G**RINDING of every description of chemical and other materials for the trade with improved mills—**TROS. HILL-JONES, LTD.**, "Invicta" Mills, Bow Common Lane, London, E. Telegrams: "Hilljones, Bochurh, London." Telephone 3285 East.

**P**ULVERISING, Grinding, Mixing, Drying. **CRACK PULVERISING MILLS LTD.**, 49/51, Eastcheap, E.C.3. Mansion House 4406.

**TRIBASIC PHOSPHATE OF SODA**  
Free Running White Powder

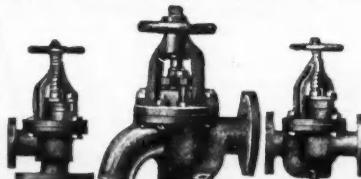
Price and sample on application to:  
**PERRY & HOPE, LIMITED, Nitshill, Glasgow**

**KEEBUSH**

Keefbush is an acid-resisting constructional material used for the construction of tanks, pumps, pipes, valves, fans, etc. It is completely inert to most commercial acids; is unaffected by temperatures up to 130°C; possesses a relatively high mechanical strength, and is unaffected by thermal shock. It is being used in most industries where acids are also being used. Write for particulars to—

**KESTNER'S**  
5 Grosvenor Gardens, London, S.W.1

**YOU CANNOT BETTER HAUGHTON'S REGULUS ACID VALVES FOR ACIDS AND ACID LIQUORS**



**HAUGHTON'S METALLIC CO., LTD.**  
30, ST. MARY-AT-HILL, LONDON, E.C.3.

**Acid Resisting Vacuum  
EJECTORS**

Steam or Water Operated for all Filtra-  
tion, Evaporation or Distillation Plants.

**lennox** Foundry Co. Ltd.

Glenville Grove, London, S.E.8  
Specialists in corrosion problems

**"ZULO"**



**LEIGH  
& SONS  
METAL  
WORKS**  
Orlando St.  
BOLTON

**S. GIRLING & SONS,  
(COOPERS) LTD.**

**Barrel & Drum Merchants**

STEEL DRUMS RECONDITIONED BY US  
SPEEDY DELIVERIES

Suitable for all Trades

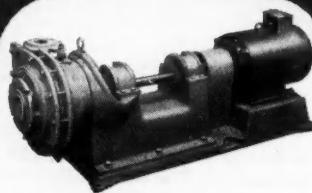
Office and Cooperage:  
59 LEA BRIDGE ROAD, LEYTON E.10  
Tel: Leytonstone 3852

**"LION BRAND"**  
**METALS AND ALLOYS**

MINERALS AND ORES  
RUTILE, ILMENITE, ZIRCON,  
MONAZITE, MANGANESE, Etc

**BLACKWELL'S  
METALLURGICAL WORKS LTD.**  
GARSTON, LIVERPOOL, 19  
ESTABLISHED 1869

**Mitchell CENTRIFUGAL  
ACID PUMPS**



L.A. Mitchell have long experience in the design of equipment for acid pumping, storage and distribution and will be pleased to offer their services in this direction. The centrifugal acid pump illustrated is available in a wide range of sizes and will handle all acids and corrosive liquors with the exception of hydrofluoric.

**L. A. MITCHELL LIMITED**

37 PETER STREET MANCHESTER

Phone: BLAckfriars 7224 (3 lines)

MP.13

**PIPERIDINE**

COMMERCIAL

PYRIDINE FREE

**LUPETIDINE**

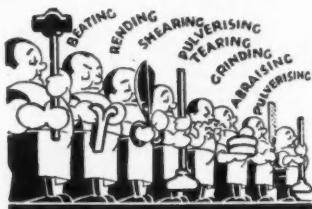
FULL DETAILS  
FROM ACTUAL  
MANUFACTURERS

**ROBINSON  
BROTHERS LTD**

CHEMICAL MANUFACTURERS  
RYDERS GREEN • WEST BROMWICH

Tel: West Bromwich 0080  
HEAD OFFICE: OLDSBURY • BIRMINGHAM

## THE PULMAC MILL



FOR REDUCING CHEMICALS TO THE FINEST POWDER or GRANULATION MADE

IN FOUR SIZES

INTERNATIONAL PULVERISERS Ltd.  
70, VICTORIA ST., LONDON, S.W.1.

Telephone—Victoria 2958.  
Telegrams—Pulgrind, Sowest, London.

## IMMEDIATE DELIVERY

LEVER LOCKING  
DETACHABLE HEAD  
DRUMS

40/44 Gallon Capacity  
measuring 34 $\frac{1}{2}$ " x 22 $\frac{1}{2}$ "

Limited stocks

**GEO.W. ORR & Co. Ltd.**  
8 COUSTONHOLM ROAD,  
GLASGOW, S.3.

Telegrams: Containers, Glasgow. Telephone : Langside, 1777.

## FOUNDED 1830

Old-established yet up-to-date in every detail this organisation provides a specialised service for the chemical industry that ensures rapid delivery and low prices all the time

MANUFACTURERS AND PROPRIETORS OF  
**"INVICTA"** DECOLOURISING  
CARBON  
PLUMBAGO, CHARCOAL (Wood & Animal), MANGANESE

**"INVICTA"** BITUMINOUS MATERIALS  
FOR ROAD CONSTRUCTION

**GRINDING** With improved mills, of  
every description of  
chemical and other materials for the trade

## THOMAS HILL-JONES, LTD.

MANUFACTURING CHEMISTS, INVICTA WORKS, BOW COMMON LANE, LONDON, E.3.

and at MEESON'S WHARF, BOW BRIDGE, E.15 : CONTRACTORS TO H.M. GOVERNMENT

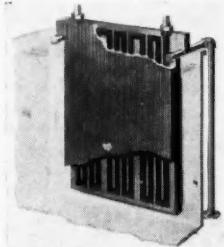
Telephone : EAST 3285 (3 lines).

Telegrams : Hilljones Bochurh, London

# KARBATE

TRADE MARK

## IMPERVIOUS GRAPHITE IMMERSION HEATERS



### "Karbate" Plate Heater

"Karbate" Plate Heaters are designed for pickling tanks, plating tanks or other services where heating or cooling of corrosive liquids is required. These strong, durable, compact units are highly resistant to thermal and mechanical shock. Various sizes are made of standard component parts assembled to fit individual needs of the job.

### CONSULT—

**BRITISH ACHESON ELECTRODES LTD**  
GRANGE MILL LANE, WINCOBANK, SHEFFIELD

Telephone : Rotherham 4836 (3 lines)

Telegrams : Electrodes, Sheffield

*Totally  
enclosed*

### MOTORS for PAINT PRODUCTION

Where the situation does not call for flameproof pattern, Metrovick totally-enclosed fan-cooled motors with integral fan-operated air cooling circuits are designed for use in the corrosive and dusty atmosphere of chemical works.

*Left: A Metrovick 40 h.p. flameproof motor driving Banbury mixer at a large paint works in the Midlands. The control gear is also of the Metrovick flameproof pattern.*

**METROPOLITAN VICKERS**  
ELECTRICAL TRAFFORD PARK · MANCHESTER 17  
CO. LTD.

50

N  
a  
g  
e  
s.  
he  
m.

C801